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And Engineer

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NEW ORLEANS WATERWORKS

PUMPING STATION, APRIL 25, 1908

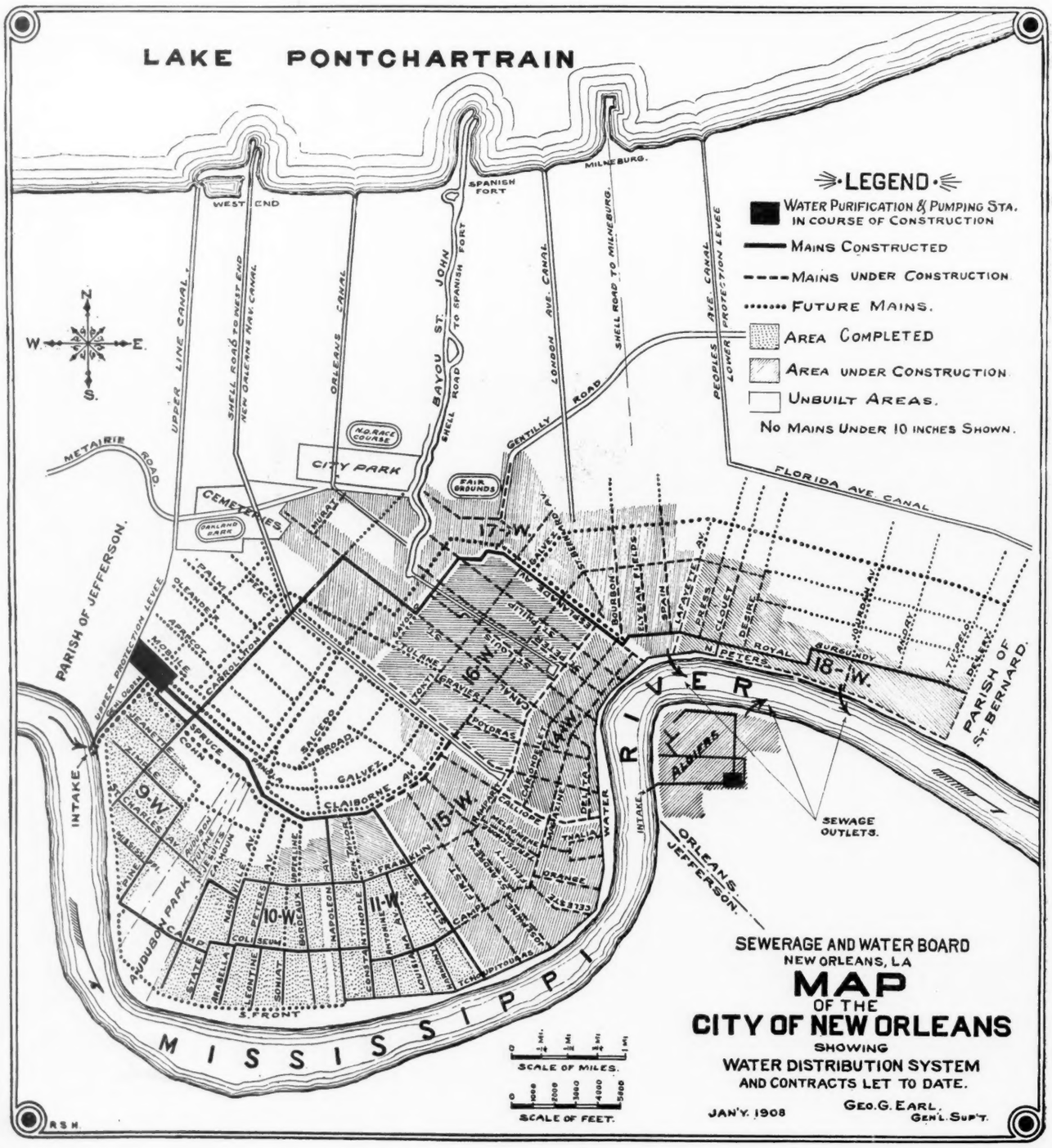
THE tax payers of New Orleans, at a special election on June 6, 1899, by a vote of 6,272 to 394 agreed to the levying of a special tax of two mills for 43 years on all the real and personal property in the city, to provide for improved systems of water supply, sewerage and drainage; to provide for which a constitutional amendment was later passed by the State Legislature in special session and ratified at a State election. This tax of two mills has made possible the financing of $12,500,000 worth of fifty-year bonds to be used for the purposes named; and any one who was familiar with past conditions at New Orleans, when it was little better than a pestilential swamp suffering almost continuously from scourges of yellow and typhoid fever and other diseases resulting from these conditions, will probably agree that no money could be spent by its citizens to a better advantage. The drainage already completed has infinitely improved these conditions.

From the beginning of this work the investigation, plans and construction have owed much to the oversight of the General Superintendent, Geo. G. Earl, who first suggested, early in 1900, the necessity for a thorough preliminary investigation. An advisory board of engineers was appointed and held its first meeting in June, 1900; this board consisting of B. M. Harrod, Thos. L. Raymond (deceased), L. W. Brown, and A. C. Bell of

New Orleans, and Rudolph Hering and Geo. W. Fuller of New York. The investigation made by the Sewerage and Water Board under the advice of the Board of Engineers is probably familiar to most of our readers, its thoroughness and the high standing of all those engaged in it having combined to make the results obtained of unusual value.

Great credit is due to the Sewerage and Water Board for the intelligent and far-sighted methods which they have employed in the work, and their willingness to spend whatever money was necessary to obtain the most reliable results, combined with efforts to keep down all unnecessary expenses. Concerning both general policy and construction methods they have relied continually on Mr. Earl's judgment and his recommendations have had the greatest weight. The Board has been carrying on simultaneously, but independently, the investigation and construction of the sewerage, water supply and drainage.

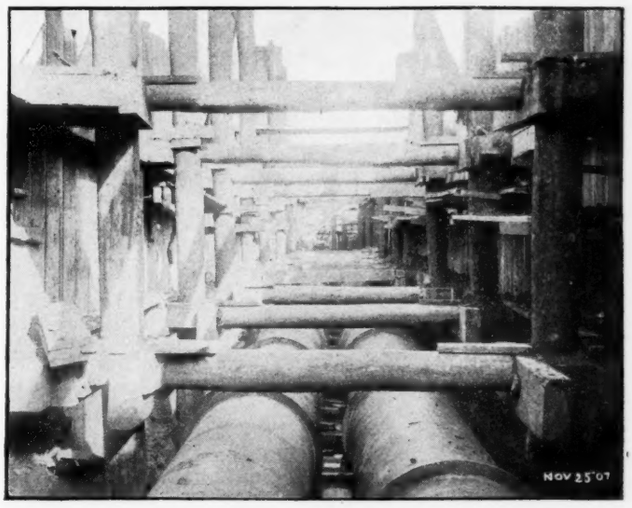
Up to the present time practically all the drinking water used in the city has been obtained from individual private cisterns which are supplied by rain water drained from the roofs of dwellings. This water is quite palatable but is subject to contamination from dust, insects, etc., washed from the roofs, and the cisterns have offered breeding places for mosquitoes which are now recog-



nized as the transporters of yellow fever germs. A private water company has pumped water directly from the river and distributed it without any purification; but this is extremely turbid, although quite free from pathogenic bacteria, and was used for manufacturing purposes and by some residences.

The thorough scientific study of the question of purifying the river water (since no supply naturally pure was available) was conducted at a plant in Audubon Park under the direction of Robert Spur Weston and was continued for eight months from December 15, 1900. Stated briefly this investigation showed that Mississippi water at New Orleans contains on an average about 600 parts per million of suspended matter, equivalent to about 2.7 tons per million gallons of water. During some floods this was increased as much as fourfold. This suspended matter consisted of such fine particles that plain subsidence removed but little of it during any practicable period of time. The final conclusion with reference to purification was: "Taking into consideration all the available evidence it is concluded that the American system is best adapted to the purification of the Mississippi River water at New Orleans."

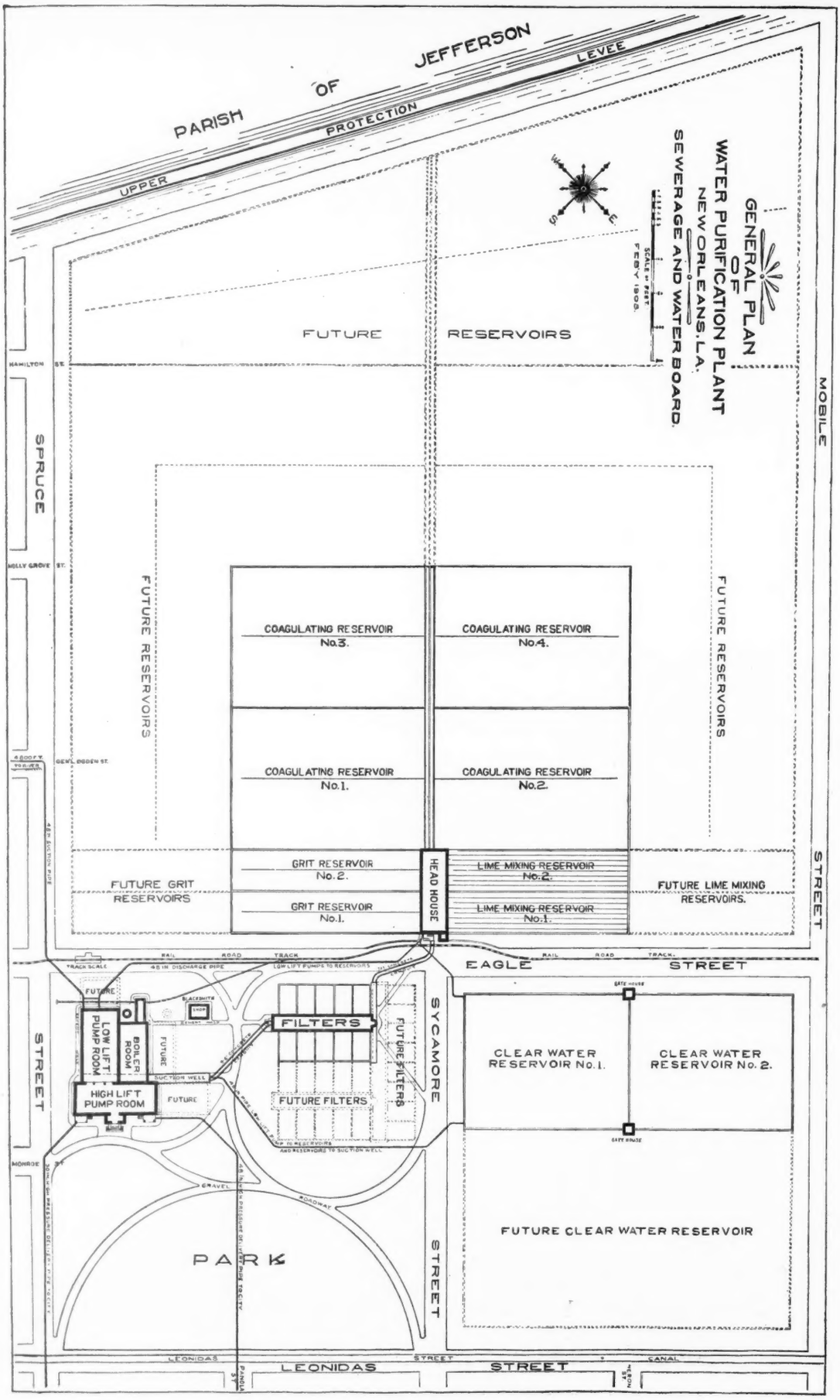
Utilizing the knowledge gained from these experiments, plans were drawn for the pumping and purification plant. The general map of the water works system on the opposite page shows the location of the plant in the city and also the progress made in constructing the distribution system to January 1, 1908. The general layout of the pumping station, filters, etc., is shown on the following page.



TWO 48-INCH SUCTION PIPES LAID THROUGH LEVEE

Water is taken from the river about three-fourths of a mile from the pumping station. Two 48-inch cast-iron intake pipes extend through the levee; only one of

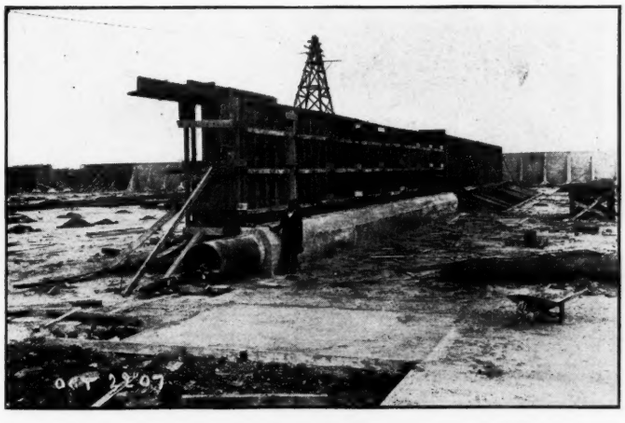
PUMPING STATION—THREE LOW-PRESSURE SUCTION PUMPS—HIGH-PRESSURE SERVICE PUMP IN THE DISTANCE


PARISH OF JEFFERSON
UPPER PROTECTION LEVEE
GENERAL PLAN OF WATER PURIFICATION PLANT
NEW ORLEANS, LA.
SEWERAGE AND WATER BOARD.
SCALE OF FEET
FEBY 1900.
FUTURE RESERVOIRS
HAMILTON ST.
SPRUCE
HOLLY GROVE ST.
GEN'L EGDEN ST.
MONROE ST.
MOBILE STREET
FUTURE RESERVOIRS
FUTURE RESERVOIRS
COAGULATING RESERVOIR No.3.
COAGULATING RESERVOIR No.4.
COAGULATING RESERVOIR No.1.
COAGULATING RESERVOIR No.2.
GRIT RESERVOIR No.2.
GRIT RESERVOIR No.1.
HEAD HOUSE
LIME MIXING RESERVOIR No.2.
LIME MIXING RESERVOIR No.1.
FUTURE GRIT RESERVOIRS
FUTURE LIME MIXING RESERVOIRS.
RAIL ROAD TRACK
TRACK SCALE
48 IN DISCHARGE PIPE
LOW LIFT PUMPS TO RESERVOIRS
EAGLE STREET
FUTURE
BLACKSMITH SHOP
LOW LIFT PUMP ROOM
BOILER ROOM
FUTURE
SUCTION WELL
HIGH LIFT PUMP ROOM
FUTURE
FILTERS
FUTURE FILTERS
FUTURE FILTERS
SYCAMORE STREET
GATE HOUSE
CLEAR WATER RESERVOIR No.1.
CLEAR WATER RESERVOIR No.2.
GATE HOUSE
GRAVEL
ROADWAY
PARK
FUTURE CLEAR WATER RESERVOIR
LEONIDAS STREET
LEONIDAS STREET
CANAL

which, however, will be used at present. The tops of these pipes are two feet below extreme low water, at which grade the pipes are carried horizontally to the pumping station, thus permitting water to reach the high pressure pumps without requiring any lift in case this should be desirable. Ordinarily, however, the water will be raised by low pressure suction pumps; of which there are three cross-compound driven centrifugal pumps, each with a capacity of 40 million gallons per day, which deliver the water to the head house where the control valves and by-passes are located. From here the natural course of the water is to the grit chambers, which are in duplicate and have a capacity of 6,560,000 gallons, through which it moves slowly, requiring one hour for complete transit, during which the heavier particles are deposited.

From the grit chambers the water again passes through the head house and as it leaves this a lime solution is introduced to effect both a softening of the water and precipitation of the fine suspended matter. The water then passes in a winding course through the lime mixing chamber at the relatively rapid rate of one foot a second with the object of effecting a thorough mixture of the lime and water; this velocity also being such that no sedimentation in this reservoir is anticipated. These chambers also are in duplicate. Again passing through the head house the water goes to the coagulating reservoirs, of which there are four having a combined capacity of 30 million gallons, where it remains about seven hours, giving ample time for floculent precipitation due to the lime.

In the coagulating reservoirs a large amount of suspended matter will be deposited by the coagulating action of the lime alone. To assist this action, and depending upon conditions for time and amount of application, a certain amount of sulphate of iron will be added that the water may reach the filters in a condition best adapted to successful and economical filtration. This gives results similar to the use of sulphate of alumina in producing clearness and purity, with the further advantage that the hardness and carbonic acid gas present are eliminated or very greatly reduced. Pipes built into the bases of the partition walls, as shown in the illustration, will be used for introducing the iron sulphate, and also additional raw water, lime water, or soda, should any such corrective treatment be found desirable at this stage.



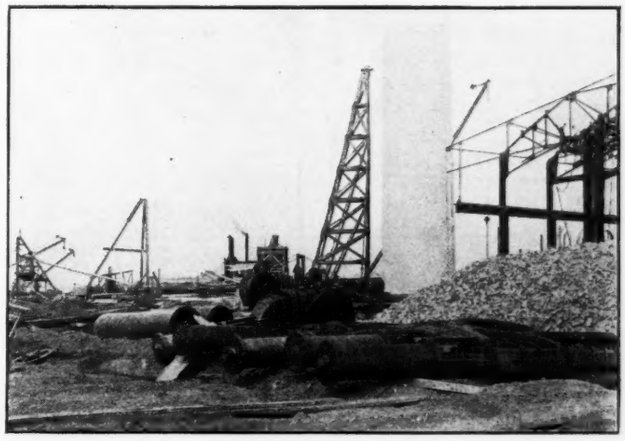
COAGULATION BASIN, SHOWING DIVISION WALL WITH PIPE IN BASE FOR CORRECTIVE TREATMENT—OUTSIDE WALLS IN THE BACKGROUND

During the seven hours in the coagulating and settling reservoirs the water is so gradually displaced that the suspended matter in it, already coagulated by the lime mixing (and when necessary, further coagulated by a sulphate of iron addition), deposits nearly all of its suspended matter, and as it leaves these basins, instead of carrying from 200 to 1,500 parts per 1,000,000 gallons of such matter, it will only carry from 30 to 60 parts, which can be readily removed by the filters.

A plant of 4,000,000 gallons per day capacity, of similar design, is to be constructed in Algiers, on the west bank of the river.

From the coagulating reservoirs the water passes for a fourth time through the head house and thence to the filters, of which there are ten, each with an area of 1,431 square feet and a capacity of six million gallons per day, which implies a velocity of 130 million gallons per acre per day.

After passing through the filters the water flows into an equalizing chamber located beneath the filters, and from this to the clear water well from which it is drawn by the four 20-million-gallon, vertical, triple expansion, high service pumps. A 20-million-gallon centrifugal pump driven by a cross compound engine delivers water



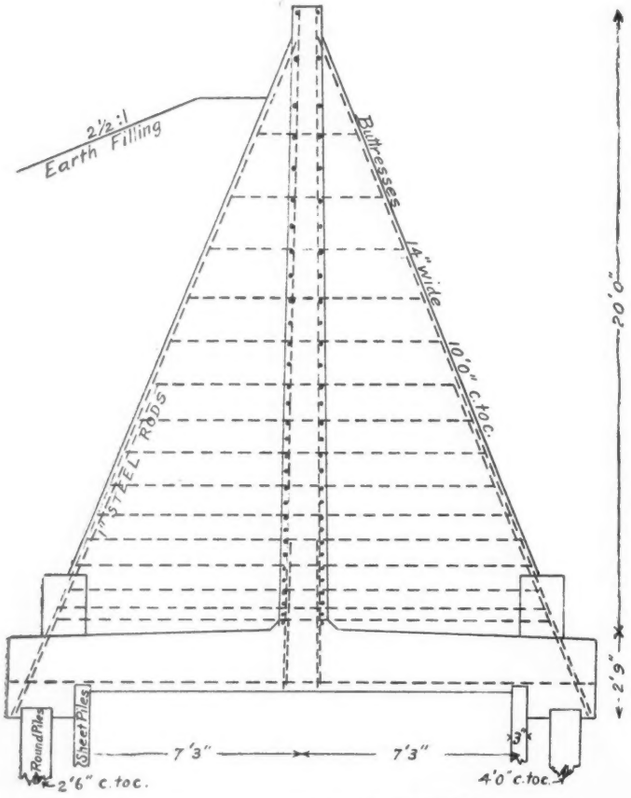
HYDRAULIC VALVES USED AT PUMPING PLANT

from the clear water well to two covered clear water storage reservoirs which have a combined capacity of 15 million gallons. A complete system of by-passes is provided at all points so that the course of the water can be controlled at will, any one of the processes just described being omitted if desirable.

All the valves at the plant are hydraulically operated and were manufactured by the Chapman Company. Those used on the service mains, however, were furnished by the R. D. Wood Company. From the high pressure pumps one 48-inch and one 30-inch main lead to the distribution system.

The head house contains, besides the controlling valves, the chemical mixing plant with its elevators and other appliances and also the chemical laboratory. Here also is located the automatic regulating mechanism for applying chemicals for both ordinary and corrective treat-

ment. The object of this regulating mechanism is to maintain the same proportion between the chemical or corrective water and the raw water, whatever the amount of the latter passing through the plant. A gauge may be set for any desired percentage of chemicals, and this percentage will then be automatically maintained by a variation in the pressure of the water in the chambers corresponding to the varying quantities of flow. This mechanism was designed by Mr. Earl to meet the local conditions and is believed to be entirely original with this plant. A similar device is used for controlling the flow of the water from the filter beds also.

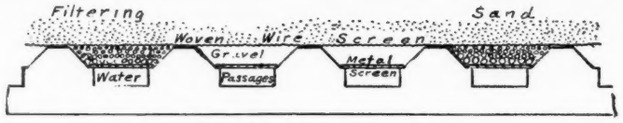


OUTSIDE WALL OF GRIT RESERVOIR

Horizontal Reinforcing Rods in Buttresses 1-2 inch diameter; Vertical Rods in Wall 5-16 inch; Horizontal Rods 5-8 inch

Many of the construction details of the filters differ from those found elsewhere because, in most cases, of the alluvial nature of the soil upon which they are founded and the large amount of moisture contained therein. Beneath all the main walls were driven both sheet and round piling. All walls are thoroughly buttressed on both sides, the buttresses being 14 inches wide and 10 feet between centers and the outside buttresses have secondary supporting buttresses. In the construction of the clear water reservoir the columns and roof were carried on piles, while the floor rested directly on the soil; the joint between the columns and the floor being made a slip joint with clay packing. In this foundation work there were used 517,910 lineal feet of round piling averaging 45 feet in length.

The strainer system, which completely covers the bottoms of the filters, is supported by concrete ridges, over

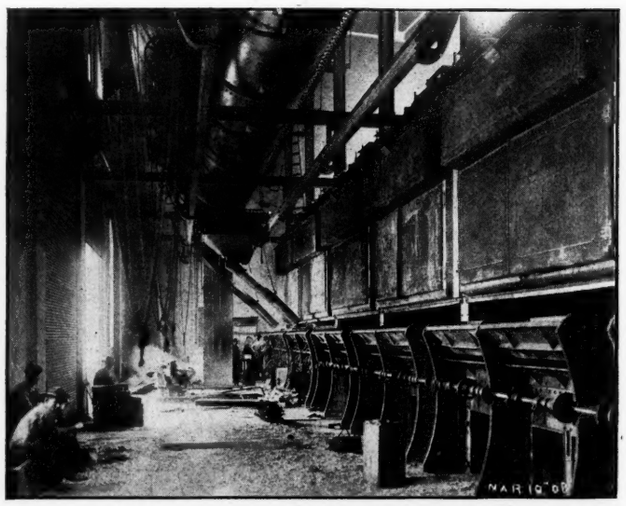


FILTER STRAINERS AND DRAINS

the openings between which are perforated metal screens which support layers of graded gravel carried up flush with the tops of the ridges. Resting on this and separating the gravel from the filtering sand above it is a woven wire screen, the object of which is to prevent the intermingling of the sand and gravel when the filter is washed. The wash water is removed by central troughs rather than troughs on the outside walls such as are found in many other plants. The washing apparatus is so contrived that compressed air can be used for forcing the wash water through the sand at any desired pressure. It is expected that less than 3 per cent. of the filtered water will be required for washing.

The general contract for the pumping and purification plant was let to Black and Laird for about $1,800,000. The Allis-Chalmers Company contracted for $500,000 for the pumping plant, this including the boiler house with its six 400-horsepower Heine boilers. These are provided with Ross mechanical stokers, Foster superheaters, and economizers; also a complete coal crushing and handling system. In February of last year a contract was let to the Camden Iron Works for 40,000 tons of cast-iron pipe for $1,273,288.20; this being sufficient to complete the distribution system through all of the built-up section of the city. At the same time the contract for hauling and laying about 50 miles of mains was let to the General Contracting Co. for $491,527.50. In September the laying of 250 miles of pipe, etc., were let in four contracts to Irwin Brothers, M. O'Herron & Co., and the General Contracting Co. of New Orleans, and A. S. Patterson & Co., of Macon, Ga.

The total cost of the water works system is estimated at $6,825,329, and the report of the Sewerage and Water Board for January 1, 1908, showed that $3,219,350 had



BOILER HOUSE OF PUMPING PLANT, SIX 400 H. P. BOILERS, MECHANICAL FEEDERS, STOKERS, ETC.

been expended up to that time. The plans of the City Engineer call for a completion of all parts of the water works system by January 1 of next year, and it is quite probable that this will be accomplished, as work is now progressing rapidly. There remained to be laid between 260 and 270 miles of water mains. Over 200 miles of the largest mains have already been completed and the work of laying the remainder is now progressing at the rate of 500 blocks per month. One difficulty met with has been the holding in place of the dead ends of the big mains, on account of the spongy nature of the soil, but this has been overcome by the building of concrete retainers or anchors.

The New Orleans plant will have a capacity of 40 million gallons per day. A smaller plant having a capacity of 4 million gallons per day and built along the same lines is being constructed in Algiers, a section of the city on the oposite side of the river, by the Algiers Waterworks and Electric Company, which has agreed to sell the same, including standpipe, to the city for $100,000.

The architecture of the pumping stations and other buildings connected with both the water supply and sewerage systems was carefully considered and an effort made to have it harmonize with the traditions and situation of the city, as well as be suitable from an engineering standpoint. The same general style is followed in all these buildings, as that shown in the pumping station at the head of the article.

The Sewerage and Water Board at present consists of Mayor Martin Behrman, president; James McRacken, John J. Frawley, E. P. Brandao, R. M. Walmsley, Chas. J. Theard, Lewis Johnson, Jos. Voegtle, Geo. H. Dunbar, Henry G. Hester, Frank A. Daniels, John McGraw and Wm. Atkinson. Mr. F. S. Shields is the secretary. The following force have acted as assistants to Superintendent Earl: J. W. Armstrong, principal assistant engineer; W. F. Crotts and John F. Eastwood, who designed the distribution system; W. C. Kirkland, the drainage system; Alfred Raymond, M. E., E. E., and A. B. Wood, the operation of the drainage machinery. James G. Lee has been construction engineer in charge of all inspectors and all work done directly by the Board. John L. Porter has had charge of the laboratory during construction and will have charge of the water purification plant as chief chemist.

PRICES PAID FOR CAST-IRON PIPE, BY ST. LOUIS, MO., DURING TWENTY YEARS

Compiled by WM. H. BRYAN, *from Data furnished by* W. E. ROLFE, *of the St. Louis Water Department*

DATE OF ORDER	SIZES IN INCHES, AND QUANTITIES IN TONS												Price per ton 2,000 lbs. del. at yds.	Average Prices, by Years
	3	4	6	8	10	12	15	20	30	36	42	48		
——'88													$26.45	$26.45
2-19-'89			330	75		395							26.33	26.33
4- 2-'91						590							27.84	
7-28-'91			125			515							26.75	27.11
8- 9-'91			1,428	130		910	6			26			26.75	
2-10-'92			35			55		1,000	210				19.47	
4-25-'92						60					65		24.95	23.85
7-30-'92			1,440	40		720							25.48	
10-19-'92						5				685			25.48	
9-18-'93	10	30	1,400			1,560		2,035		450			19.40	19.40
8-21-'94			810			810	10	1,780	3,350	380			19.94	19.94
4- 1-'95			8			12			3,307	1,300			19.85	
5-23-'95		8	787			55							20.96	21.09
9-20-'95								950	5,400				22.47	
2- 8-'96	25	75	1,550	15		1,200							24.00	
8-12-'96			900			1,450		350					19.64	21.19
10-12-'96			5			30		155	2,915	6,905			19.94	
6-10-'97			750		6	1,400		1,044					14.57	
7-12-'97											53		16.50	16.30
9-29-'97				30		70	50	1,200	100				17.84	
3-31-'98			575			1,500	15	1,085		25			14.97	14.52
7-25-'98			600			1,330		1,405				15	14.08	
2-20-'99			650			2,700		350	400				18.80	21.60
6-16-'99			600			1,075		1,120		1,305			24.40	
4-23-'00			1,000			2,600		2,050					27.49	25.66
8-14-'00			12			28				5,350			23.84	
5- 4-'01			700			1,620		2,110	820	950			22.93	22.93
3- 8-'02			1,145			1,025		2,345	2,770	2,015			25.83	27.38
5- 1-'02			830	175	225	550				1,580			28.93	
3-30-'03		15	1,390			1,190	30	1,175	700				32.25	32.25
6- 4-'04		50	1,140			860		1,160	20	3,200			24.90	24.90
5- 1-'05			1,160										27.45	
5- 1-'05						1,360							26.45	26.53
5- 1-'05								375	840	153			25.70	
1-29-'06			2,200			2,650		1,650					28.90	
9-15-'06			1,350										30.75	29.82
9-15-'06						200		1,050					29.80	
5-14-'07			1,430			1,075		1,460		2,161			35.00	

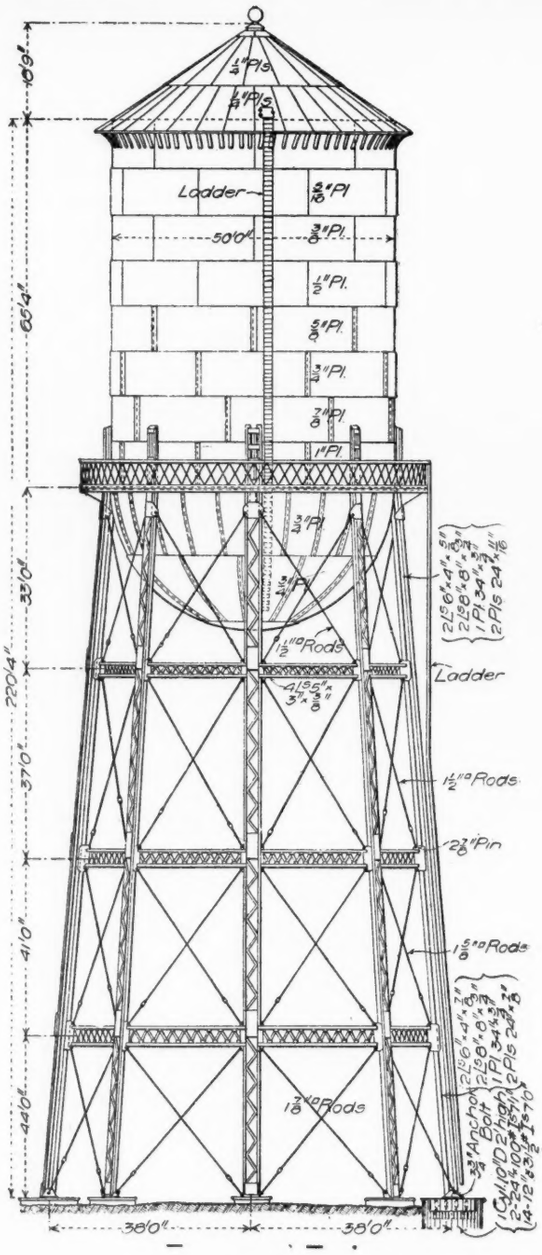
During the spring of 1908 prices of $22.50 to $23.00 have been obtained in that section of the country on large orders.

THE LOUISVILLE WATER TOWER

Ten or fifteen years ago the use of tanks elevated upon towers for municipal water supplies was confined almost exclusively to small villages, and standpipes were used when any large capacity was desired, although the lower parts of such structures were almost useless for storage capacity, except when placed upon a hill, where a reservoir would generally be preferable. Several alternative bids received about that time for standpipes and also for tower-supported tanks of the same diameter and elevation of top, resulted in lower bids sometimes for tanks and sometimes for standpipes.

In planning the addition of a high-pressure service to its plant the Louisville (Ky.) Water Company compared designs for tank and standpipe, each to store 1,200,000 gallons above a point 155 feet from the ground. It was estimated that a standpipe would cost more than three times as much as an elevated tank; in addition to which the calculated thickness of the bottom ring of the standpipe was 2 4-10 inches, a thickness which it is not considered practicable to give to steel of the desired quality. The tank decided upon was 50 feet in diameter and about 90 feet high, of which 65 feet 4 inches is cylindrical, and the balance a hemispherical bottom. It was estimated that if this were to be elevated upon a 50-foot tower, the cost of it and of a 50-foot standpipe of equal height would be equal; if on a 100-foot tower, the standpipe would cost twice as much; and if on a 150-foot tower, three times as much. (Calculation shows that the amount of water contained above the 155-foot elevation is really less than 1,000,000 gallons, the whole tank containing 1,200,000 gallons, above elevation 130.)

VIEW OF COMPLETED TOWER

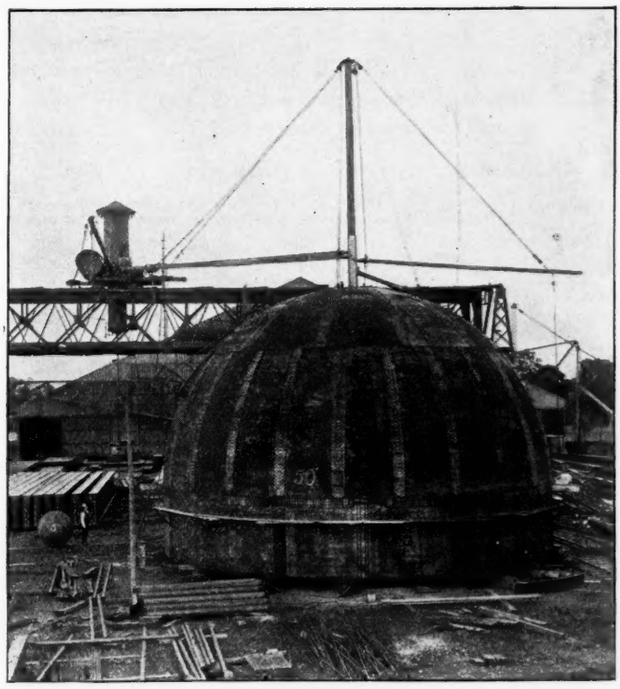


DETAILS OF TOWER AND TANK

The weight of the tank is about 700,000 pounds, and that of the supporting tower about the same. The contained water, when the tank is full, weighs about 10,000,000 pounds. The height from foundation to top of roof is 239 feet 1 inch. We believe this is the largest water tower ever constructed. It was built by the Chicago Bridge and Iron Works under the direction of the late Charles Hermany as engineer for the water company.

The tank is supported by a steel tower of eight columns, built in four stories. Each column is supported by a separate masonry pier, which was carried down to a hard stratum, and on top of which is a grillage of I-beams to distribute the load over the masonry, these being embedded in concrete and the whole surrounded by a short 10-foot steel cylinder.

Each column is a rectangular box made of two 24-inch built-up channels with a 34-inch cover plate on one side and the other latticed with zigzag 3½-inch angles. The



HEMISPHERICAL BOTTOM ASSEMBLED AT WORKS

channels are made of 8x8-inch angles on the inner side and 6x4-inch angles on the outer, with 24x⅞-inch web-plates.

The tank is supported on the tower by brackets, one over each column, riveted to the bottom ring of the cylinder. Level with the bottom of this ring is a balcony 5½ feet wide carrying a railing 5 feet higher. A ladder, fastened to one of the columns, gives access to this balcony. Another ladder reaches from the balcony to a trap door in the roof, beneath which is an inside ladder. In the center of the roof is a 28-inch circular ventilating opening protected by copper netting in the form of a vertical cylinder, which is in turn roofed over, thus preserving the tank from pollution by birds, insects, etc. A vertical 50-inch pipe of riveted steel connects the center of the hemispherical bottom with the mains, which are about 12 feet below the surface. This serves as both inlet and outlet.

The cylindrical part of the tank contains eight rings of steel plates, the bottom one 1-inch thick and the top 5-16-inch, with alternate inside and outside joints. The hemispherical bottom is of ¾-inch plates. It forms a butt joint with the bottom ring of the cylinder, 13x½ inch inside and outside cover splice plates joining the two.

The hemispherical bottom is formed of two rings, the larger ring containing 24 pieces, and the smaller one 12. The very center is formed of a flat plate 10 feet 9 inches in diameter, with a flange connection for the vertical pipe.

The roof is of ¼-inch steel plates, in three rings, containing 8, 16, and 32 plates respectively. It is stiffened by a number of light trusses formed of ⅝-inch rods and 2x2x½-inch angles. It overhangs the cylinder about 3 feet.

The hemispherical bottom and the first ring of the cylinder were assembled at the shop and the rivet holes drilled in that position, the plates being handled by a vertical wooden spar which passed through the central opening and carried four light booms, which also served to support the reaming machines, two of which were electric and two pneumatic. One of the illustrations shows the bottom thus assembled, the spar and booms and a reaming machine on the left side of the dome. A comparison of size may be made with the man at the left and the 5-foot sphere behind him. Another illustration shows the completed structure, an idea of the size of this being obtained from the man half-way up the vertical part of the ladder on the right hand side. The third gives practically all of the principal dimensions of the structure.

FORM FOR WATER WORKS STATISTICS

Recommended by the New England Water Works Association, American Society of Municipal Improvements and Other Societies Throughout the United States.

TABLE No. 1

GENERAL AND PUMPING STATISTICS.

Name of City or Town	Date of Construction of Works	By Whom Owned	Source of Supply	Mode of Supply	1	2.—Description of Fuel Used.				
					Builders of Pumping Machinery	*a* Kind	*b* Brand of Coal	*c* Av. Price per Gross Ton	*d* Per Cent. of Ash	*e* Wood, Price per Cord

PUMPING STATISTICS

3	4	4a	5	6	7	8	9	10	11	12
Coal Consumed for the Year (Lbs.)	Lbs. of Wood ÷ 3 = Equivalent Coal	Amount of Other Fuel Used	Total Equivalent Coal Consumed for the Year (Lbs.) (3) + (4)	Total Pumpage for the Year in Gallons	= Average Static Head Against which Pumps Work (Feet)	Average Dynamic Head Against which Pumps Work (Feet)	Number of Gallons Pumped per Lb. of Equivalent Coal	Duty in Foot-Pounds per 100 Pounds of Coal No Deductions	Cost per Million Gals. Pumped into Reservoir Figured on Pumping Station Expenses	Cost per Million Gals. Raised 1 Foot High, Figured on Pumping Station Expenses

TABLE No. 2

FINANCIAL STATISTICS.

RECEIPTS

Balance Brought Forw'd		Water Rates			Municipal Departments						
a From Ordinary Receipts	*b* From Extraordinary Receipts	A Fixture Rates	B Meter Rates	C Total from Consumers	D For Hydrants	E For Fountains	F For Street Watering	G For Public Buildings	H For Miscellaneous Uses	I General Appropriation	J Total from Municipal Departm'ts

Receipts.—*Continued*				Expenditures.							
Municipal Depts.—*Continued.*				Maintenance Expenditures			DD	EE	FF	Construction Expenditures		
K From Tax Levy	L From Bond Issue	M From Other Sources	N Total Receipts	AA Operation	BB Special	CC Total Maintenance	Interest on Bonds	Payment of Bonds	Sinking Fund	GG Extension of Mains	HH Extension of Services	II Extension of Meters

Expenditures.—*Continued.*

Construction Expenditures *Continued*		LL	MM		N		O	P	Q	R
			Balance							
JJ Special	KK Total Construction	Unclassified Expenses	*aa* Ordinary	*bb* Extraordinary	Total	Disposition of Balance	Net Cost of Works to Date	Bonded Debt at Date	Value of Sinking Fund	Average Rate of Interest Per Cent.

TABLE No. 3

STATISTICS OF CONSUMPTION OF WATER

	1	2	3	4	5	6	7	8	9	10	11	12
Name of City or Town	Estimated Population			Total Consumption for the Year (Gallons)	Quantity Used Through Meters (Gallons)	Percentage of Consumption Metered	Average Consumption (Gallons per Day)				Cost of Supplying Water. Per Million Gallons	
	Total at Date	On Line of Pipe	Supplied at Date				Total	To Each Inhabitant	To Each Consumer	To Each Tap	Figured on Total Maintenance (Item CC)	Figured on Total Maintenance + Interest on Bonds

TABLE No. 4

STATISTICS RELATING TO DISTRIBUTION SYSTEM.—Main Pipes.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Kind of Pipe	Sizes of Pipes (Inches)	Length Extended During the Year (Feet)	Length Discontinued During the Year (Feet)	Total Length in Use (Miles)	Cost of Repairs (Per Mile)	Number of Leaks (Per Mile)	Length of Pipe Less Than 4 Inches Diam. (Miles)	Hydrants		Gates				Range of Pressure on Mains (Pounds)
								Number Added	Total in Use	Number Added	Total in Use	Number Smaller Than 4-Inch	Number of Blow-off Gates	

TABLE No. 5

STATISTICS RELATING TO DISTRIBUTION SYSTEM.—Service Pipes

16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Service Pipe					Service Taps				Meters				Motors and Elevators	
Kind	Sizes (Inches)	Extended (Feet)	Discontinued (Feet)	Total in Use (Miles)	Number Added	Total in Use	Average Length of Services (Feet)	Average Cost of Services for the Year	Number Added	Now in Use	Percentage of Services Metered	Percentage of Receipts from Metered Water (B) ÷ (C)	Added	Total in Use

THE above tables give in full the method of keeping and reporting the various statistics concerning the physical features, and the operation and maintenance of water works systems, which has been proposed by the New England Water Works Association. This was prepared by the association a number of years ago, and since then such minor changes have been made as use of it suggested, the last such change having been made in the form for financial statistics in September, 1902. In 1906, statistics were kept in this form by about fifty cities, including ten or more outside of New England. Every Water Works Superintendent who is intelligently interested in maintaining his plant in the best possible condition and operating it in the most economical way appreciates the necessity of keeping careful records in some such way as that outlined in these tables; also the benefit to be derived, as well as the interest satisfied, by comparing his own plant with those of other cities. The first requires a good method of compiling data and drawing conclusions therefrom; the latter, that standard forms be employed by all plants between which comparisons are to be made. The form given above has been used for nearly ten years, and has commended itself to a considerable number of cities. It is the only one which has met with anything like general adoption, and we believe that Water Departments and companies generally could not do better than adopt this form for their future reports.

A WOOD PIPE CONDUIT

Constructed at Carney's Point, N. J.—Four Miles of New Flat Gradient—Steel Pipe Used—Automatic Regulating Valve—Contract Prices

By T. CHALKLEY HATTON, M.AM. Soc. C.E.

BELIEVING that wood stave pipe construction has now become of sufficient interest to the engineer who is called upon to design the modern municipal water works to warrant him in studying the plants in the Eastern States where this method of construction has been used, the writer ventures to briefly describe a work of this character which he designed in 1906, and which was completed in July, 1907.

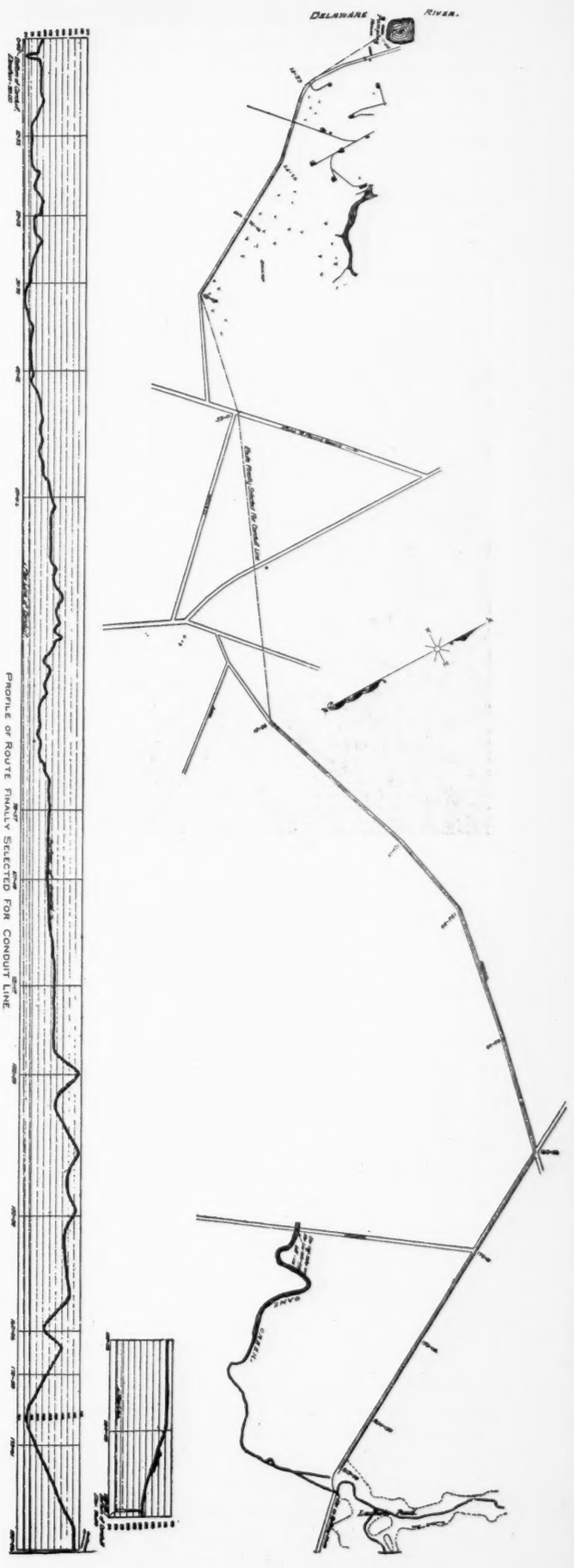
The E. I. du Pont de Nemours Company operates a smokeless powder manufacturing plant at Carney's Point in southern New Jersey, which is on the Delaware River opposite to the city of Wilmington. For many years the water supply was obtained partially from the Delaware River, by pumping with centrifugal pumps to an impounding reservoir located within the works, and partially from driven wells. The river water, at certain seasons, contained so much salt that it was neither suitable for the boiler plant nor for the manufacture of powder, in which large quantities of water is used for washing the cotton, and the well water contained so much iron that it discolored the cotton. It therefore became necessary, as the output of the plant increased, to secure another source of supply.

Four miles inland from the plant was an abandoned mill pond, fed by a small stream having a watershed above the pond of about 8.8 square miles, with a minimum daily yield of 1,728,000 gallons, which yield was obtained by weir measurements.

The old dam had been washed out for many years, but the indications of flood elevation, which determined the water rights, were still visible, and showed that the water could be legally maintained in this pond at an elevation of 192.58 (assumed datum).

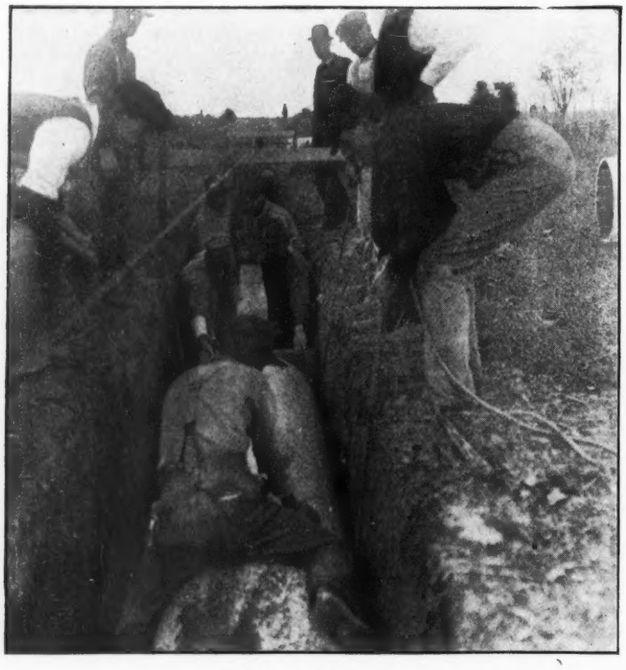
The elevation of the overflow weir in the lower pond or reservoir was 98.31, or only 4.27 feet below the feed pond and 2,619 feet distant, and the expenditure which might be made upon an economic basis was about $100,000. Thus the problem resolved itself into getting the cheapest conduit possible and one which would carry the greatest volume of water. These two considerations were sufficient to warrant the use of wood stave pipe; but there was still another very vital one.

Test pits had been sunk at several points of the line, and showed that large volumes of underground water and light sand would be encountered, thus insuring a very expensive construction if cast-iron or steel pipe were used. This condition also precluded the use of continuous wood stave pipe, as the writer considered it would be impracticable to keep the water out of the trench to such an extent that such pipe could be built therein. We were thus forced to the use of sectional-made wood stave pipe, although it was entirely new to us, and the writer recommended its use with some misgivings.



PLAN AND PROFILE OF ROUTE SELECTED FOR WOOD PIPE LINE

The quantity of water necessary to be delivered at the lower reservoir was 1,200 gallons per minute as a minimum and 1,800 gallons maximum. It was estimated that when the two reservoirs were full, that is, when the difference of elevations was 4.27 feet, a 24-inch pipe would deliver 1,500 gallons per minute, and when the elevation of the water at the lower pond was at its minimum there would be a difference of elevation of 6.57 feet and the 24-inch pipe would then deliver 1,900 gallons per minute. This size was therefore decided upon.



LAYING WOOD PIPE

The pipe was laid at a uniform grade of .0001547 foot per foot, or a total fall of 3.5 feet in the whole distance. The maintaining of a uniform grade throughout required very deep cutting in many places, over two miles being at an average cut of 9 feet. The average cutting for the line was 7 feet, with a maximum of 17 feet and a minimum of one foot. Three-fifths of the excavation was made through a fine water-bearing sand, where the water horizon was uniformly four feet above the grade of the conduit. The trench for this portion was closely sheathed, but in spite of all practical precautions there was rarely less than six to eight inches of water standing in the trench at all times during construction, and in this depth of water most of the pipe had to be laid. Steam pumps were located at different points along the line and the water was allowed to flow through the conduit to these pumps, a constant flow of water being thus maintained through most of the conduit during construction.

It was altogether one of the most difficult and discouraging pieces of pipe laying the writer has ever seen done in an experience of twenty-four years, and only through the indefatigable efforts of Mr. J. L. Warner, resident engineer in charge of the work, and B. F. Sweeten & Son of Camden, N. J., the contractor, was the work satisfactorily completed. Each length of pipe, after being placed at grade in the trench, had to be anchored down to prevent its floating.

The pipe, which was made by the Wyckoff Wood Pipe Company of Elmira, N. Y., consisted of Canadian white pine staves 1⅞ inches thick, and about 22 staves to the pipe, which were held together by a spirally wound steel band 1½ inches wide of No. 18 gauge spaced 3-inch pitch. One edge of each stave had a double bead cut into it which fitted into a double groove cut into its neighbor. The edges of the staves were cut radially and the faces curved corresponding with the inside radius of the pipe, so that when put together the inside circumference was almost a perfect center.

The pipe and steel bands were thoroughly covered with a heavy coating of pitch at the works, and while this coating was fresh the pipes were rolled in a bed of sawdust. This outside coating of sawdust seemed to protect the pitch in shipping and handling so that when received in the trench there was but little evidence of any disturbance to the coating, but care was taken to thoroughly cover with new pitch any places where the coating had been rubbed off and the steel band was exposed before the pipe was lowered in the trench.

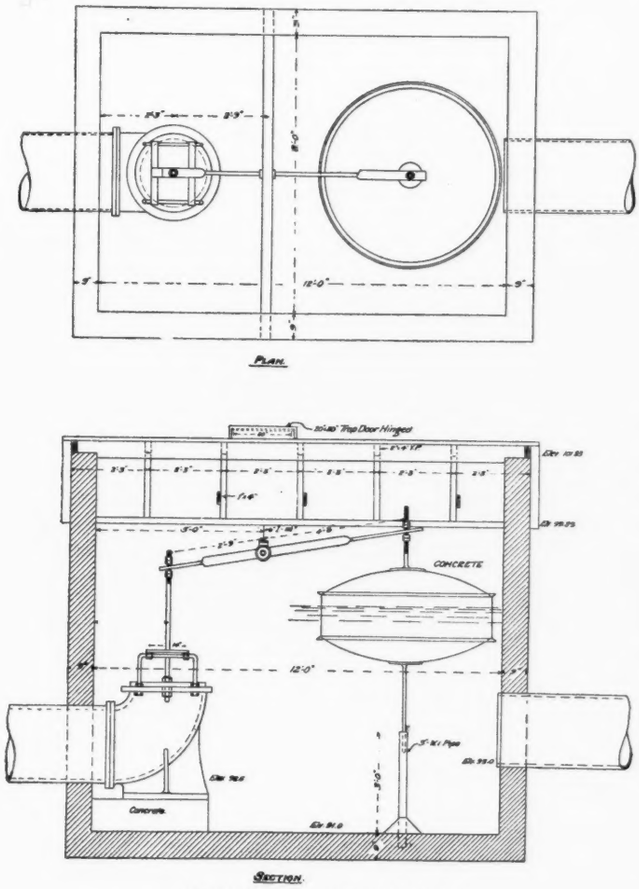
The pipe came to the work in lengths varying from 3 to 8 feet. There was cut upon one end a tenon 4 inches deep by 15-32 of an inch thick, which fitted into a chamber cut in the end of its neighbor. This tenon and chamber fit very snugly and each length of pipe had to be driven pretty hard before the tenon entirely entered the chamber. When completed, however, the pipes joined perfectly, leaving no projections of any kind throughout the entire inner surface. The short sections of pipe were used to lay curves, of which there were several having a radius of 300 feet.

WOOD PIPE LAID AROUND A CURVE

As the laying of the pipe was not a continuous operation, there being several sections constructed simultaneously, arrangements had to be made to join the pipes where two sections met. This was satisfactorily accomplished by cutting off the tenon and chamber from adjoining sections and connecting them together with a wrought iron band 4 inches wide placed around the exterior diameter of the pipe and cinched up tightly. Where valves and blow-off branches were built into the conduit, cast-iron nipples were used and the chamber of the wood pipe driven over the bead ends of the nipples, a reinforcing wrought iron band being put around the outside of the wood chamber.

There was a section of conduit about 700 feet long where the grade brought the top above the surface of

the public road, which had to be raised to cover the conduit. For fear the travel would crush wood pipe under this condition, locking-bar steel pipe, as made by the East Jersey Pipe & Foundry Company, was used. This pipe was ¼-inch thick, specified to withstand a hydrostatic pressure of 100 pounds, and was coated with Assyrian Asphalt special pipe coating. The pipe came upon the ground in 30-foot sections and was riveted together at the end joints with ⅞-inch rivets.



AUTOMATIC REGULATING VALVE

One feature of the pipe line which demands a passing notice is the automatic regulating valve built into the conduit at its lower end just before it enters the lower pond. So far as the writer is aware this is the first illustration of this kind of valve being used under these conditions, and so far it has served its purpose very satisfactorily. The regulator is built in a brick chamber adjoining the reservoir as the accompanying elevation and plan shows. The conduit is turned up with a vertical cast-iron quarter bend, the upper end of which is machine-planed to a true and even face. Upon this face a brass valve is fitted horizontally, its path of movement being restricted to the guides attached to the cast-iron bend. The valve is actuated by a copper float attached to a lever, as shown upon the plan. As the height of the water in the pond rises or lowers, it closes or opens the valve through the raising or lowering of the float. Thus the water in the upper pond is not only prevented from wasting over the weir of the lower pond, but the wood pipe conduit is always kept full of water which is a condition necessary to prolong its life; although it would be hardly possible to imagine that this wood pipe would ever decay, as it is thoroughly surrounded with water, both inside and out, except at its lower end, where for 5,000 feet it was laid through dry soil.

The writer intended to have made some observations to determine the carrying capacity of this wood conduit, as it is not often that necessity requires a conduit of this length to be laid with such a flat grade and low head, especially if it be made of wood; but so far conditions prevailing at the company's plant have made these observations impracticable. However, the conduit is delivering all the water which the company can use and the valve has not yet been fully opened. Roughly speaking the present consumption is 1,500 gallons per minute.

One interesting feature of this work which should be referred to is the contract prices for materials and labor entering into the construction of the conduit, as showing the practical difference between wood, steel and cast iron pipe.

Cost of 24-inch wood stave pipe f. o. b. cars at Carney's Point was $1.28 per foot.

Cost of 24-inch locking-bar steel pipe f. o. b. cars at Carney's Point was $3.50 per foot.

Delivering wood pipe from cars to trench, laying same, excavation, backfilling and all other work attending the laying of the 24-inch wood pipe was $1.077 per foot.

Delivering steel pipe from cars to trench, laying same, excavation, backfilling and all other work attending the laying of the 24-inch steel pipe was $1.00 per foot.

The average haul for both kinds of pipe was two miles, and labor cost on an average $1.65 per day.

In comparing the cost of excavation, etc., for the wood and steel pipe, it must be considered that the average cut of the trench for the wood pipe was 7 feet with a maximum of 17 feet through very wet material, whereas the average cut for the steel pipe was 3 feet through dry material.

At the time this work was contracted for 24-inch cast-iron pipe was selling in this market for about $30.00 per ton, which would represent a cost f. o. b. cars at Carney's Point of $3.00 per foot. The lead, hemp, caulking, laying, excavation and backfilling and hauling would have cost about $1.67 per foot, if the laying of cast-iron pipe had been practicable.

Thus, considering only the actual cost of the pipe delivered on board cars at Carney's Point, the use of wood pipe meant a saving of $37,840 over the cost of cast-iron, and $48,840 over the cost of steel. If this comparison were carried further and the cost of transporting and laying cast-iron or steel considered, the additional saving in the use of wood pipe would be startling, for the actual cost of laying the wood pipe was never more than three cents per foot, and where the trench was dry it was as low as one cent.

From the start of the work until completion the wood pipe grew in favor with everyone connected with the work, and with no one more than with the writer, who,

early in the work, appreciated the ease and accuracy with which the pipe could be built and the obstacles which arose to make the laying of any other kind of pipe almost impossible; and he firmly believes that machine made wood pipe, of the character supplied upon this work, has a future place in the construction of water works and the transporting of water which engineers and water works superintendents would do well to study.

ESTIMATED LIFE AND DEPRECIATION OF WATER WORKS PLANTS

The table below was compiled by Wm. H. Bryan from the various sources named, and presented as part of a paper on "The Appraisal and Depreciation of Water Works and Similar Properties," which was read before the Engineers' Club of St. Louis and printed in the Journal of Association of Engineering Societies. This paper was a very complete discussion of the subject, too lengthy and concise for even a synopsis in our columns. We recommend its perusal by all interested in the subject.

Material	Life in Years	Depreciation Per Cent. Per Year: Straight	Depreciation Per Cent. Per Year: Sinking Fund	Authority
Entire Works		1.465		Los Angeles, Cal., 29.3% in 20 years. *Engineering News*, May 4, 1899.
" "		1.667		Kansas City, Mo.: 33 1/3% in 20 years. Wynkoop Kiersted, Proceedings Am. Soc. C. E., 1897.
" "		1.1		22% in 20 years. Tuttle, same as previous.
" "		0.62		Quincy, Ill.: 18.7% in 30 years. *Engineering Record*, July 23, 1904.
" "		2.47		Valparaiso, Ind.: 37.1% in 15 years. *Muncie Engineering*, May, 1903.
" "		0.86	1.58	Mobile, Ala.: 12% in 14 years. *Engineering News*, April 23, 1903.
" "	37.35	1.95	1.49	Washington, Mo.: 37.3% in 19 years. Wm. H. Bryan.
" "	40			C. Palmer, Proceedings Am. Soc. C. E., 1897.
" "			1.00	Court, Contra Costa, Cal.: *Engineering Record*, June 1, 1901.
" "	37		1.50	F. C. Coffin, Proceedings Am. Soc. C. E., 1897.
" "	31		2	Haverhill, Mass.: Proceedings Am. Soc. C. E., 1897.
" "		1.99		Rich Hill, Mo., Wm. H. Bryan.
" "		2.21		Galena, Kan., Wm. H. Bryan.
" "		2.91		Mt. Carmel, Ill., Wm. H. Bryan.
Boilers	6–23			Average of 32 boilers, average life 15 years. John W. Alvord, Am. W. W. Ass'n, 1903.
"		5-7		N. S. Hill; *Engineering Record*, June 8, 1907.
"	15			Prosser; *Engineering News*, Vol. XLVII, p. 425.
"	20-30			W. Kiersted; Proceedings Am. Soc. C. E., 1897.
"	20			Robert Hammond; *Engineering Record*, June 15, 1907.
"	10–12.5			Dawson, in *Iowa Engineer*, July, 1906.
"	14–15			Iowa Electrical Association; in *Iowa Engineer*, July, 1906.
"	25			Benezette Williams: Galena, Kan., appraisal in 1905.
"	30			Wynkoop Kiersted: Galena, Kan., appraisal in 1905.
"		8		Chicago City Railway; *Street Railway Journal*, Dec., 1898.
"	14.3–25			Wm. H. Bryan.
"		2.5–4		W. H. Rosecrans; Galena, Kan., appraisal in 1905.
"		6		B. S. Dodge; Mt. Vernon, Ill., appraisal in 1906.
"	25			Chas. B. Burdick; Mt. Vernon, Ill., appraisal in 1906.
Brick Buildings		2		Iowa Electrical Association, in *Iowa Engineer*, July, 1906.
" "		2		N. S. Hill; *Engineering Record*, June 8, 1901.
" "	40			Prosser; *Engineering News*, Vol. XLVII, p. 425.
" "	25–40			Wm. H. Bryan.
" "		7		W. H. Rosecrans; Galena, Kan., appraisal in 1905.
" "	60			Robert Hammond; *Engineering Record*, June 15, 1907.
" "	50–100			Dawson; *Iowa Engineer*, July, 1906.
" "	25–33–50			Iowa Electrical Association; *Iowa Engineer*, July, 1906.
" "	30			Benezette Williams; Galena, Kan., appraisal in 1905.
" "	30			Wynkoop Kiersted; Galena, Kan., appraisal in 1905.
" "		5		Chicago City Railway; *Street Railway Journal*, Dec., 1898.
" "		3.5		B. L. Dodge; Mt. Vernon, Ill., appraisal in 1906.
" "	35			Chas. B. Burdick; Mt. Vernon, Ill., appraisal in 1906.
Wooden Buildings		5		N. S. Hill; *Engineering Record*, June 8, 1901.
" "		4		W. H. Rosecrans; Galena, Kan., appraisal in 1905.
" "	15–30			Wm. H. Bryan.
Pumping Engines	20–25–30	5		Wm. H. Bryan.
" "		3–10		N. S. Hill; *Engineering Record*, June 8, 1901.
" "	15			Prosser; *Engineering News*, Vol. XLVII, p. 425.
" "	20–30			Wynkoop Kiersted; Proceedings Am. Soc. C. E., 1897.
" "		4.7		W. H. Rosecrans; Galena, Kan., appraisal in 1905.
" "	25			Robert Hammond; *Engineering Record*, June 15, 1907.
" "	10			Boiler feeds. Iowa Electrical Association; *Iowa Engineer*, July, 1906.
" "	3–36			Average of 50 engines, average life, 21.3 years. J. W. Alvord; Am. W. W. Ass'n, 1903.
" "	25–30			Benzette Williams; Galena, Kan., appraisal in 1905.
" "	30			Wynkoop Kiersted; Galena, Kan., appraisal in 1905.
" "		2.5		B. L. Dodge; Mt. Vernon, Ill., appraisal in 1906.
" "	30			Chas. B. Burdick; Mt. Vernon, Ill., appraisal in 1906.
Water Filters	15–20			Wm. H. Bryan.
Fire Hydrants	25–35			Wm. H. Bryan.
" "		2		Los Angeles, Cal.: *Engineering News*, May 4, 1899.
" "	40			Benzette Williams; Galena, Kan., appraisal in 1905.
Water Meters		3		Los Angeles, Cal.; *Engineering News*, May 4, 1899.
" "		2.1		Mobile, Ala.: *Engineering News*, April 23, 1903.
" "	20			Benezette Williams; Galena, Kan., appraisal in 1905.
" "	20			Wm. H. Bryan.
Cast Iron Pipe	50–75			Wm. H. Bryan.
" " "	68			Los Angeles, Cal., *Engineering Record*, Aug. 28, 1897.
" " "		1.25		" " " Good Soil; *Engineering News*, May 4, 1899.
" " "		2		" " " Poor Soil; *Engineering News*, May 4, 1899.
" " "	20–60			Rudolph Hering; Proceedings Am. Soc. C. E., 1897.
" " "	25–60			Wynkoop Kiersted; Proceedings Am. Soc. C. E., 1897.
" " "	70			Gas Mains. Prosser; *Engineering News*, Vol. XLVII, p. 425.
" " "	Over 50			Pearsons; Proceedings Am. Soc. C. E., 1897.
" " "		1.14		W. H. Rosecrans; Galena, Kan., appraisal in 1905.
" " "		1		B. L. Dodge; Mt. Vernon, Ill., appraisal in 1906.
" " "	100			John W. Alvord; Proceedings Am. W. W. Ass'n. 1903.
" " "	100			Chas. B. Burdick; Mt. Vernon, Ill., appraisal in 1906.
" " "	80			Benezette Williams; Galena, Kan., appraisal in 1905.
" " "	75			Wynkoop Kiersted; Galena, Kan., appraisal in 1905.
Service Pipe	10			Wm. H. Bryan.
" "		2.5		Los Angeles, Cal.; *Engineering News*, May 4, 1899.
" "		5		B. L. Dodge; Mt. Vernon, Ill., appraisal in 1906.
Reservoirs	50–75			Wynkoop Kiersted; Proceedings Am. Soc. C. E., 1897.
"	40–75			Wm. H. Bryan.
"	100			Chas. B. Burdick; Mt. Vernon, Ill., appraisal in 1906.
Standpipes	25–30			Wm. H. Bryan.
"		4		W. H. Rosecrans; Galena, Kan., appraisal in 1905.
"	40			Benezette Williams; Galena, Kan., appraisal in 1905.
"	30			Wynkoop Kiersted; Galena, Kan., appraisal in 1905.

BROOKLYN'S HIGH-PRESSURE SERVICE.

Two Pumping Stations—Electric Driven, Multi-Stage Turbine Pumps—Operate Against 300 Pounds Pressure—Plan of Operation—Test.

Of the several boroughs of Greater New York, those of Manhattan and Brooklyn are now provided with high-pressure fire pumping stations and distribution mains for delivering water, either from the regular reservoirs or drawn directly from the river, for special fire service in the business district.

The main pumping station of the Brooklyn system is located on the river at Furman and Joralemon streets. There is also a reserve station located at Willoughby and St. Edward streets. The distribution system comprises approximately 5 miles of 20-inch pipe, 6 miles of 16-inch pipe, 10 miles of 12-inch pipe and 1½ miles of 8-inch pipe, making a total of over 22 miles of pipe. Inserted in the pipe lines are gate valves to the number of 68 20-inch, 99 16-inch, 140 12-inch and 705 8-inch. There are 681 special hydrants, each provided with four nozzles, the main valve operating against pressure and independent valves being provided for each nozzle. There are also twenty-four fireboat connections of special two-nozzle hydrants to enable the pumps on the fireboats to assist the stationary pumps in time of need. The distribution mains are cross-connected in such a manner that, in the event of a break, repairs may be made without affecting any hydrant except those located in the block in which the break occurs and without appreciably diminishing the supply or the pressure on the remainder of the system. The distribution system covers territory extending along the East River water front, from the Erie basin to the navy yard, and wide enough to include the down-town business section, being approximately three miles long and from a mile to a few hundred feet in width, comprising a total area of about 1,360 acres.

It is intended that both the main and reserve stations shall draw water from the present regular supply mains, but in case of a shortage of such supply the main station can draw water (more or less salt) directly from the East River. By the use of suitable vacuum pumps, automatically operated, the mains between the river and the pumps are kept full of this water, so that, if it should be desired to use it, river water would be delivered instantly upon opening the valves at the pumping station. There are two suction lines, controlled by valves, whose stems extend through the station floor, either of which lines will supply sufficient water for the entire station.

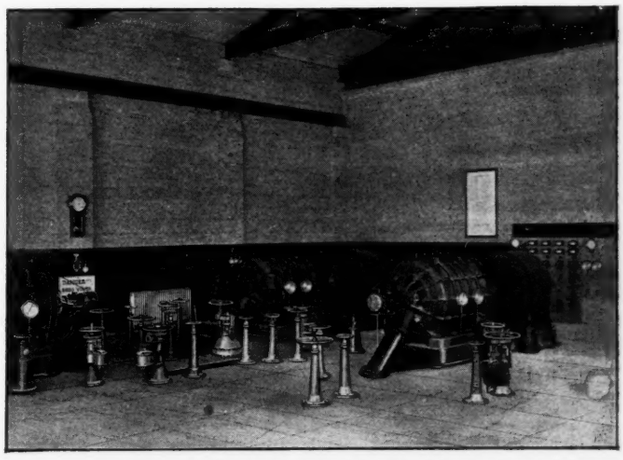
The pumps are electric driven, and the current for operating the motors is three-phase, 25-cycle, 660 volts, and is supplied by the Edison Electric Illuminating Company of Brooklyn, or, in case both their stations fail, by the Brooklyn Rapid Transit Company. The main station has two regular feeder lines and one reserve line, any or all of which may be supplied from any of these three power stations. The reserve station has one regular feeder line and one reserve line, either of which may be supplied from any of the power stations. The Edison Company also supplies 220-volt direct current for lighting the station and for driving auxiliary apparatus, such as motors for operating oil switches and valves.

The buildings for both stations are of brick with steel trusses and tile roofs. The reserve pumping station is

RESERVE PUMPING STATION

arranged for an ultimate installation of six electric motor-driven, multi-stage turbine pumps. Three of these have been installed with a combined capacity of 9,000 gallons per minute against a total head of 700 feet with a total efficiency of 66½ per cent. from electrical input to water discharge. The amount of water is automatically measured by Venturi meters, provided with a recording dial; the pressures of suction and discharge also are measured by recording instruments and the electric current supplied to the station is recorded by a recording Wattmeter. Thus, complete records of the operation of the stations are made by automatic appliances.

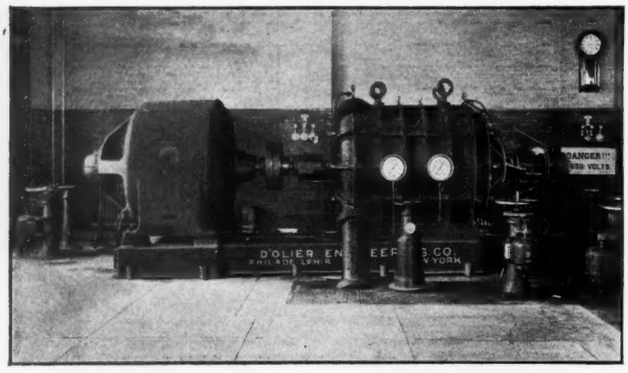
In the design and oversight of the apparatus high factors of safety were used, and great care taken to secure



INTERIOR OF RESERVE STATION
Motor Pumps, Valve Stems and Switchboard

rigid inspection in order that under no conditions should the great property values whose protection was aimed at be imperiled by the breaking down of the plant at a critical time. Both pumps and motors have their various parts interchangeable, so that worn parts may be quickly and easily replaced.

The pumps are of the multi-stage turbine type, of six stages, the pressure per stage amounting to 117 feet, giving an accumulated pressure of 700 feet. Water is discharged radially from the impeller of each stage through



ONE OF THREE MOTORS IN RESERVE STATION—MOTOR 800 H. P., A. C.—SIX-STAGE TURBINE PUMP

guide or diffusion vanes, and thence carried by return passages to the next stage, where the operation is repeated, until the water leaving the last stage is discharged into an annular discharge chamber, to which the discharge piping is connected. The pumps are made heavy and thoroughly ribbed to withstand the high pressure. Impellers and guide vanes are of bronze to resist the corrosive action of the salt water, should this be used. Each pump is designed for a normal rated capacity of 3,000 gallons per minute against a total head of 300 pounds discharge pressure, at 735 revolutions per minute, and, when tested, has shown an efficiency under this head of 70 per cent.

Each pump is direct connected by means of a flexible coupling to an 800-horsepower, 25-cycle, 6,600-volt, 4-pole A.C. motor, operating at a synchronous speed of 750 revolutions per minute, making the full load speed approximately 735 revolutions per minute. The motors developed an efficiency of over 92 per cent., with a power factor of 93 per cent. The bearings are ring-oiling, the oil reservoirs being unusually large, and after a full-load run of twenty-four hours, the heating was less than 40° centigrade, and 55° after a two-hour run at 25 per cent. overload. Both pump and motor are mounted on one sub-base, thus making each unit self-contained.

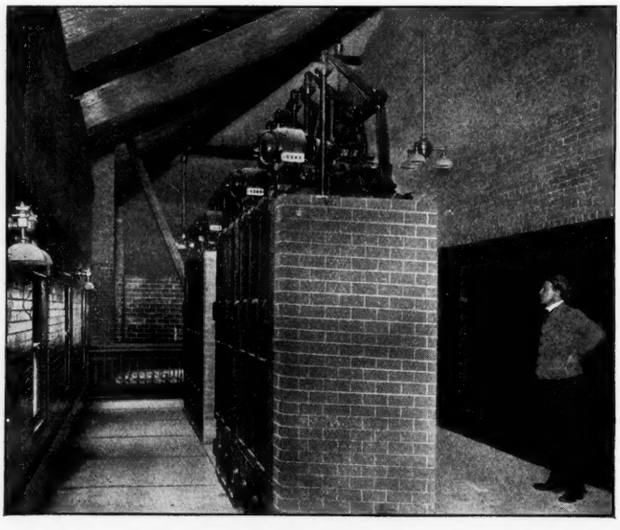
All the pumps are connected to a 20-inch suction main, which passes through the station in the form of a loop, each end of which is connected to an independent street main, thus permitting any pump to draw from either main in case the other should be dry or out of service. The individual pump suctions are of 12-inch pipe and the delivery pipes of 10-inch pipe. The latter discharge into a 16-inch main, which also forms a loop through the station and leaves as two 16-inch pipes.

The pumps operate against a pressure of 300 pounds, which can be reduced by a regulating valve. To provide against water hammer, due to the sudden closing of a fire hydrant, there is provided between the discharge pipe and suction pipe of each pump, a relief valve, which can be set to relieve at any pressure, from 100 to 300 pounds, the waste returning to the suction pipe.

The pipes of the distribution system are of cast-iron, bell and spigot. The gate valves are of special design, with spherical tops, and are of cast steel. All pipes and valves were tested to 600 pounds hydrostatic pressure at the shops, and after being laid were required to stand a test pressure of 450 pounds without showing a greater leakage than 4 gallons per linear foot of joint in twenty-four hours.

All valves in the station are operated from the main floor and are provided with cast-iron floor stands with hand wheels. The larger and more important ones are motor-driven, the motors being mounted on the stands and operating the valves through spur gears. An intermediate gear can be thrown out of mesh when it is desired to operate the valve by hand.

The switchboard contains twelve panels of blue Vermont marble 2 inches thick, located in a curtain wall at one end of the pumping room. All high-tension buss bars, controllers for induction motors, etc., are behind the switchboard, and no current of over 220 volts reaches the board itself. One panel controls each of the two incoming lines, and in the rear of each is an oil switch which controls the high-tension line. Each switchboard is operated by a small direct-current motor. One panel controls each of the three pump motors and is provided with an oil switch, operated by a small motor. The resistance coils for starting the pump motors are located back of the switchboard. Each of these panels also controls a valve motor. Two panels contain indicating and recording gauges and controllers for certain of the valve motors. One panel is arranged for tying incoming lines of direct current to the various other panels on which are mounted direct-current apparatus. A ninth panel controls the lights. The other three are left blank for future pumps.



MOTOR-OPERATED OIL SWITCHES, IN GALLERY ABOVE SWITCHBOARD

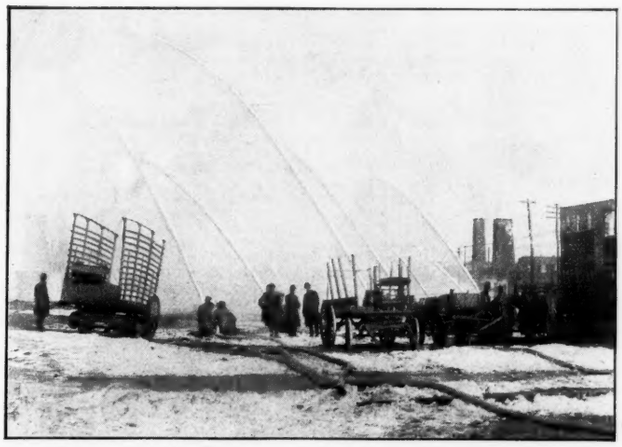
The intention at present is to operate the stations as follows: The system is divided by an imaginary line through Fulton and Court streets into two districts, the main and reserve districts. Upon an alarm coming from the reserve district, the operator at the reserve station will immediately start up one pump and put the pressure required by the Fire Department onto the entire system of

mains, and will maintain this pressure by the use of additional pumps if necessary until notified to the contrary by the Fire Department, which can communicate with him over a private telephone system from the scene of the fire. Should the operator at the main station learn from the pressure gauges that the reserve operator did not start the pumps when requested to do so, he is then to put pressure on the mains. The nozzle pressures of the fire streams can be varied by the firemen, either by throttling at the hydrant or by notifying the station operator.

To provide for the telephoning just referred to, the New York and New Jersey Telephone Company have arranged to supply private telephone service, consisting of a private tie line between the telephone switchboards in the two pumping stations, and one central office line from each of the switchboards; a private line from each pumping station to the switchboard of the Edison Electric Illuminating Company; a private line from each pumping station to the switchboard at fire headquarters; lines from telephone call boxes located near the fire alarm signal boxes (about 112 in all at present) to the switchboards in the stations; with all necessary current supply wires to the nearest central office, reserve machine for supplying current on emergency and extension telephone connected with the switchboard at each station, equipment, etc. Not more than six call boxes are permitted on the same circuit.

The work has been done under the supervision of the Department of Water Supply, Gas and Electricity of the Borough of Brooklyn, of which I. M. de Varona was Chief Engineer at the beginning, but was succeeded by John W. McKay, under whose supervision the work was completed and tested; Assistant Engineer Joseph Goodman being in direct charge of the work. The contractor for the distribution system was John J. Cashman of Brooklyn. The contractor for the buildings was Charles H. Peckworth of New York. The fire hydrants were manufactured by the A. P. Smith Manufacturing Company. The electric and hydraulic equipment for both stations was supplied under contract by the D'Olier Engineering Company of Philadelphia and New York.

This system was tested on the afternoon of March 31, although the main pumping station has not yet been completed, and all pressure was supplied from the so-called reserve station alone. The distribution system, however, was all ready for service. The telephone system has been completed within a very few days.



TESTING PLANT—PRESSURE FROM RESERVE STATION

Water was turned on first with about 90 pounds' pressure, which is about that supplied by fire engines. Five lines of hose were used at first, and it was found that the firemen could with difficulty control the nozzles at this pressure. Nozzle holders were then employed, and the pressure raised to 140 or 150 pounds with a pressure nozzle of from 75 to 80 pounds. Fourteen streams were supplied with water, which was thrown to the roofs of five-story buildings in the vicinity. The point at which the test was made is about two miles from the station supplying the power, the test being, therefore, the most severe in this respect which is possible under the present system. Although called a test, this should perhaps be termed more correctly a display, as acceptance tests of the machinery and all parts of the system had been made some time previously.

Oberlin Water Softening Plant

THE report of the Water and Sewer Department of Oberlin, O., for 1907, states that the city has now been softening the municipal water supply with lime and soda ash for four years. The Superintendent states that there was originally much prejudice against dosing the water, but the combination of familiarity of the consumers with the idea and improved operation due to experience has resulted in general commendation of the treatment. "It was always considered one of the first principles of water softening that every particle of raw water should have its proportionate amount of chemicals mixed with it; and we took great pains to attain that end. The treated water under this method always contained at least seventeen parts per million of residual caustic alkalinity, and we supposed that that could not be avoided. We discovered, however, that if the chemicals for a day's run were introduced into one-half the raw water and the balance let into the basin without chemicals the caustic alkalinity disappeared. This was true until the colder weather came and the temperature of the raw water went below 13° C., when the caustic alkalinity again appeared. We then began to add a small amount of sulphate of iron to the water as it flowed from the first basin to the second. The amount of iron was gradually increased until, when the water reached its maximum density, we were using two grains of iron per gallon. The iron sulphate removes all the caustic alkalinity and the water is as nice as in summer."

The Department analyzes the raw water for alkalinity, incrustants, magnesium and free carbon dioxide, and from the analyses calculates the chemicals required. Last year it used hydrated lime containing 69 per cent. CaO, but the Superintendent believes the lime bill could be reduced 25 per cent. by buying lump lime in bulk. The cost during the year for lime and soda was 1.3 cents per 1,000 gallons treated. The amount of lime used during the year varied from 3.4 to 9.4 grains per gallon, and the soda ash from 1.2 to 3.1 grains per gallon.

From the beginning there has been a tendency for the sand in the filters to become coated with lime, and last spring the flow was almost stopped by this, it being found that that in the upper part of the filter was heavily coated and the lower part was cemented into nearly a solid mass. The strainers were cleaned with hydrochloric acid and the filters renewed with lake sand. This sand, however, contained much soft material, which quickly turned to mud, and was later replaced with Cape May sand.

The use of lime-treated water without recarbonating was regarded as an experiment, but so far the pipe system seems to be free from any coating, as do also all but one of the 70 disc meters, the 270 meters of one make, and most of the 390 of another make; but 10 per cent. of these last required cleaning. Some of these, however, had been in use ten years without any attention and therefore deserved cleaning on general principles. The consumers, including college students, numbered about 3,400. The average daily consumption was 193,000 gallons.

MUNICIPAL BOND SALES DURING MARCH

Name of City	Estimated Population	Actual Value of Assessable Property (estimated)		Ratio of ass'd to actu'l v'lue	Bonded Debt	Sinking Fund	Net Bonded Debt		Tax Rate per $1,000 Ass'd Value	Bond Sales, March, 1908				Basis
		Total	Per Capita				Total	Per Capita		Term of Years	Amount	Interest	Price	
Huntsville, Ala	10,000	$6,000,000	$600	50%					$8.75		$18,000	5%	Par	
Little Rock, Ark											50,000	5%	Par	
Alameda, Cal										1-40 ser.	205,000	4½% s.a.	100.032	4.49
Canon City, Col										10-15 opt.	225,000	5% s.a.	97.00	5.292
Stamford, Conn	25,000	20,000,000	800	1	$270,000	$68,028	$201,972	$8.08	8.04	20	900	4%	Par	
Albany, Ga										16 avg.	75,000	5% a.	101.00	4.909
Bode, Ia										10-20 opt.	6,000	6% s.a.	104.183	5.452
Centerville, Ia										?-3 opt.	8,000	6%	101.875	
Le Mars, Ia										10	6,000	4½% s.a.	Par	
Kansas City, Kan										15	116,000	5%	101.332	4.873
Lexington, Ky	45,000	30,000,000	666	74	982,461		982,461	21.00	17.00	40	12,000	4% s.a.	Par	
Winchester, Ky										20	40,000	4% s.a.	93.00	4.536
Gardner, Mass										2½ avg.	5,000	5%	100.52	4.734
Salem, Mass										1-19 ser.	19,000	4%	100.45	3.943
										6-11 ser.	6,000	4%	100.45	3.943
Weymouth, Mass	11,700	7,316,464	625	100%	604,000	248,957	355,043	30.00	22.90	10	1,000	4%	Par	
Worcester, Mass	147,000	124,747,588	849	100%	8,518,625	3,469,802	5,048,823	34.40	16.00	10	75,000	4%	102.00	3.758
Hastings, Mich	4,500	2,000,000	444	66⅔%	40,000	4,000	36,000	8.00	10.00	12½	1,000	4%	91.65	4.92
Port Huron, Mich	22,000	17,000,000	772	66⅔%	951,395	36,500	914,895	41.00	23.15	10	45,000	5% s.a.	103.571	4.551
Thief R'r Falls, Minn										10	800	4%	Par	
Brookhaven, Miss										10	3,500	4%	Par	
Clarksdale, Miss										19 avg.	90,000	5% s.a.	Par	
Gulfport, Miss	12,000	8,000,000	666	70%	212,100		212,100	17.00	12.00	20	700	4%	Par	
Linneus, Mo	1,000	750,000	750	33⅓%	9,000	500	8,500	8.50	7.50	5-20 opt.	3,500	5% s.a.	Par	
Webb City, Mo										5-20 opt.	15,300	4½%	Par	
Beaver City, Neb										5-20 opt.	25,000	6%	104.00	5.084
Merna, Neb	750	400,000	533	20%	7,000		7,000	9.00	10.00	5-10 opt.	10,000	5% a.	Par	
York, Neb										10-20 opt.	17,000	5% a.	Par	
										1-10 ser.	35,517			
Trenton, N. J										30	50,000	4½%	104.444	4.237
Union, N. J										5-9 ser.	15,000	5% s.a.	Par	
Le Roy, N. Y	3,500	2,500,000	714	75%	60,000	6,000	54,000	15.00	9.00	1-10 ser.	20,000	5% s.a.	101.275	4.734
Mt. Vernon, N. Y	30,000	35,560,000	1,185	80%	2,278,300	613	2,277,687	75.92	20.70	3	95,000	5% s.a.	100.133	4.932
New Scotland, N. Y										5-10 ser.	18,000	5% a.	101.105	4.823
Pelham, N. Y	500	3,000,000	6,000	50%	16,000		16,000	32.00	10.00	5-20 opt.	8,000	5%	Par	
Rye, N. Y	4,000				480,000		480,000	120.00	6.18	5-30 ser.	465,000	5%	104.31	4.637
										5-29 ser.	15,000	5%	104.31	4.637
Troy, N. Y	76,000	54,250,172	714	100%	3,541,679	85,779	3,455,900	45.47	17.66	1-20 ser.	30,000	4½% s.a.	102.289	4.228
Wellsville, N. Y										16 avg.	25,953	4.85%	100.024	4.847
White Plains, N. Y	14,500				1,397,060		1,397,060	96.35	10.51	5	44,000	5%	100.70	4.84
Yonkers, N. Y	68,000	60,019,750	883		5,018,682	299,600	4,719,082	69.40	24.48	6 mos.	110,000	6%	100.70	4.56
Charlotte, N. C										30	100,000	5%	102.50	4.841
Lincolnton, N. C										30	35,000	5% s.a.	Par	
Rockingham, N. C										10	1,500	4%	Par	
Salisbury, N. C										37½ avg.	100,000	5% s.a.	101.60	4.906
Statesville, N. C										30	25,000	5%	100.50	4.97
Arlington Heights, O										1-5 ser.	984	5%	101.50	4.46
Bellevue, O	5,000	1,497,500	299		98,000	2,000	96,000	19.20	10.00	1-40 ser.	4,000	6% s.a.	107.25	5.401
Berea, O	3,000	1,500,000	500	60%	90,935	3,300	87,635	29.00	29.80	55-6 avg.	21,560	5% A.	103.319	4.357
Chillicothe, O										14	4,800	4½% s.a.	105.666	3.968
										5½-8½ op-av	4,700	4½% s.a.	102.978	3.892
										5½-8½ op-av	12,700	4½% s.a.	101.299	4.232
Clarksville, O										3-7 ser.	1,000	6% a.	106.00	4.641
Defiance, O										15 avg.	64,500	4½%	Par	
Fostoria, O										17	8,000	4% s.a.	100.083	3.992
Jefferson, O											40,000	4½% s.a.	105.027	
Lima, O	35,000	10,601,443	302	60%	853,000	260,198	574,812	16.42	38.00	1-9 ser.	13,158	5%	103.077	4.309
Madisonville, O										1-10 ser.	13,329	5% s.a.	104.017	4.174
Orrville, O										1-25 ser.	29,666	5% a.	100.012	4.995
										1-15 ser.	28,500	5% a.	104.263	4.363
Oxford, O	3,000	1,009,827	336	75%	57,500	2,910.15	54,589.85	18.00	30.70	12-20 opt.	4,500	4½% s.a.	104.875	3.985
Rockport, O										29½	13,000	4% s.a.	100.192	3.989
St. Bernard, O	4,500	4,500,000	1,000	64%	200,106	32,870	167,236	37.00	10.12	1-10 ser.	4,968	5% a.	103.99	4.18
Salem, O	11,000	7,000,000	636	40%	318,000		318,000	28.00	35.60	1-16 ser.	16,000	4½% s.a.	103.30	4.176
Wauseon, O	3,000	2,500,000	833	30%	91,417		91,417	30.47	42.40	5½ avg.	3,499	5% s.a.	103.036	4.395
										5¾ avg.	4,000	5% s.a.	103.036	4.395
Youngstown, O	60,483	56,882,000	940.45	50%	1,269,112	209,167	1,059,945	17.52	29.42	3½ avg.	10,000	5% s.a.	103.26	3.994
										2 avg.	1,910	5% s.a.	100.13	4.931
										3½ avg.	1,295	5% s.a.	100.88	4.725
										3½ avg.	1,425	5% s.a.	150.84	4.737
Hugo, Okla	4,000	1,500,000	375	40%	15,000	1,500	13,500	3.00		25	150,000		Par	
Okmulgee, Okla										20	67,000	5% s.a.	Par	
Oregon City, Ore										¾-9¾ opt.	6,027	6% s.a.	Par	
Beaver, Pa											50,000	5% s.a.	102.38	
Cambridge Sp'gs, Pa											11,000	4½% s.a.	Par	
Homestead, Pa	16,000	20,000,000	1,250	45%	458,500		458,500	28.00		20	3,100	4%	Par	
Rochester, Pa										15⅝ avg.	50,000	4½%	Par	
E. Providence, R. I	15,000	15,000,000	1,000	71%	300,000	20,684.17	279,315.83	18.00	14.00	50	200,000	4% s.a.	91.89	4.402
Johnson City, Tenn	10,000	5,600,000	560	25%	134,000	1,000	133,000	13.00	21.00	20	16,000	5% s.a.	Par	
Phoebus, Va	3,000	2,473,910	824	38%	49,000	1,000	48,000	16.00	6.50	28½	20,000	5% s.a.	90.00	5.709
Lynden, Wash										7-20 opt.	9,000	6% s.a.	Par	
Odessa, Wash	1,200				12,000		12,000	10.00	3.00	20	20,000	6%	Par	
Sunnyside, Wash	1,500	700,000	466	60%	4,500		4,500	3.00	14.00	20	4,500	6%	Par	
Charleston, W. Va										10-34 opt.	170,000	4½% a.	Par	
Beloit, Wis										1-15 ser.	15,000	4½%	98.51	4.725
Ladysmith, Wis										10	900	4%	Par	
Medford, Wis										1-15 ser.	30,000	4½% s.a.	97.10	4.943

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MAY 6, 1908.

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Water Works Statistical Tables

THE tables in this number giving data concerning water works plants and their maintenance were compiled from replies received by us from about 400 superintendents, to whom we had sent requests for such information. The replies from municipal plants are not only much greater in number than those from private plants, but also represent a greater proportion of all existing plants. There may be a number of reasons for this, the excuse that it was "in the midst of city agitation for purchase," being one given by a Southern company. While a considerable number of superintendents failed to reply, and several replies came too late for use, the number received from each district represents such a large proportion of the whole number as to give a fairly accurate idea of the general and peculiar features. Unfortunately, our space does not permit a complete presentation of the data nor an analysis of the same in this number, but these will be given in later numbers of the MUNICIPAL JOURNAL.

Among the summaries which might be made, that of the prevalence of meters is quite interesting. In New England all plants reporting use some meters; two of them meter 100 per cent. of the services; three, 90 to 100 per cent.; eight, 75 to 90 per cent.; six, 50 to 75 per cent.; eleven, 25 to 50 per cent.; the total number used in the sixty-eight cities reporting being 102,368. In the Middle Atlantic States, 92,353 are used in the sixty-three cities reporting, 19.4 per cent. of these using no meters; six having more than 75 per cent. of the service metered, and two between 50 and 75 per cent. In the South Atlantic States, 13.6 per cent. of the cities use no meters, and but one meters more than 75 per cent. of the services and three between 50 and 75 per cent. In the Ohio Valley, 15.8 per cent. of the cities are unmetered; seven cities meter all their services; nine from 90 to 100 per cent. of them; three from 75 to 90 per cent.; six from 50 to 75 per cent. In the Upper Mississippi-Missouri district, 11.9 per cent. of the cities are unmetered; six cities meter all services; eleven from 90 to 100 per cent. of them; seven 75 to 90 per cent.; eleven, 50 to 75 per cent. In the Lower Mississippi and Gulf district 8.3 per cent use no meters; 16 per cent. meter more than 75 per cent. of the services, and 16 per cent., from 50 to 75 per cent. Of ten cities of the Rocky Mountain district, six are metered, only one of these metering more than 30 per cent. of the services.

Of nine Pacific Coast cities, eight use meters, two of them 90 per cent. or more, and one 60 per cent. Of twelve Canadian cities eleven use meters, but only one of these meters more than 15 per cent of the services.

Ninety plants report some purification of the water. Of these, fifty-three are municipal and thirty-seven private; the private forming a larger percentage of those reporting than do the municipal; which would seem to indicate that, contrary to claims often made, water companies are more considerate of the quality of water furnished than are municipalities.

The blanks sent for the purpose of collecting these data were condensed from the form of the New England Water Works Association, and all cities using this form in their annual reports were able to fill in the blanks completely and with no work other than that of copying figures already prepared. Should all companies adopt and use this form, complete tables similar to these could be prepared with little trouble to any one, and to the edification of all water works officials.

THE ACCOUNTING END

By A. KINNAIRD TOD*

THERE was a time when a man who wrote down in a book the amounts of money due to him by various people and marked them off when they were paid would have been considered a careful bookkeeper. Later no doubt some cautious soul conceived the idea of keeping a record of what he owed in the same book. The progress and improvement in the keeping of records has been continuous from that day to this. The original bookkeeping idea, namely, keeping a record of Assets and Liabilities, Purchases and Sales has been developed and extended so that nowadays the man at the head of a business can tell the whole run of his business at any time from his books and can see reflected in these records any unusual conditions that may prevail for even a short period.

It is a curious fact, but true in my experience, that one seldom, if ever, finds a really successful business in which there is not a good bookkeeping system. This may sound like the view of an accountant trying to unduly magnify the importance of his particular line, but the explanation is simple. Any man who has the requisite organizing ability to build up a great business, knows that the only way in which he can keep closely in touch with all the operations without an undue waste of valuable time, is by having the records so systematized that full reports giving all the necessary details come to him regularly through the bookkeeping department.

But modern organization and the desire of all producers to get the best results at the lowest possible expense has led to a system of interchange of information among operating heads of businesses which is undoubtedly of great value to everybody concerned. To get the full value out of an interchange of comparative cost figures, however, it is necessary that the same basis should be adopted in arriving at these figures. The natural result is that a standardization of the accounts of many different classes of undertakings is at present being evolved. The accounts of Public Utility Corporations are especially going through this process.

Of course it is not possible to devise a system of bookkeeping which will be suitable for both large and small corporations. Take as an instance the consumers' ledger of a water supply corporation. In a large corporation that ledger may be kept on the card system. Several clerks will be in charge of these card ledgers, another clerk will keep the controlling account of these ledgers The cashier who receives the cash from consumers will not write up the cash book or deliver the receipt for the cash to the consumer; and by such methods of divided responsibility and internal checking, the chances of defalcation are reduced to a minimum. In a small company, however, such methods are not feasible and a card, or even looseleaf consumers' ledger, contains elements of danger.

While a uniform system of bookkeeping is not practical, therefore, a uniform distribution of operating receipts and disbursements and a careful classification of the items to be included in the various accounts is not only practicable but most advantageous. Such a classification having been arrived at, the operating heads of companies will find a study of the reports of other companies most instructive. In making comparisons, local conditions will of course always have to be taken into consideration, the area served compared to the number of consumers, the point at which the company delivers the water to consumers, the varying costs of opening and relaying streets and many other influencing factors. But certain general comparisons can always be made, differences looked into and explained, and certain fundamental principles firmly established on the rule of averages.

One essential principle which should be established for each particular company is the amount which should be spent or set aside each year for the repairs and maintenance of the plant, mains, services, and meters, and the additional amount which should be set aside each year as a depreciation or renewal fund.

In recent years the necessity of creating such a reserve has been overlooked, intentionally or otherwise, by many companies operating water works. Municipalization of public utilities has been in the air and the companies naturally have decided to be prepared for it and to make the best showing they can in order to sell out to the municipality at a good price. The simplest way to accomplish this was to charge every renewal, and even some ordinary repairs, up to plant account, instead of to operating expenses. The result was, of course, to swell the value of the plant unduly and to increase the operating profits, both excellent arguments on which to base a claim which would handsomely reimburse the stockholders of the water company for the loss of their property. While the company's figures are seldom, if ever, accepted as they stand, the fact of the book value of the property having been so much always has a certain moral effect, and this is counted on by the management of the companies in planning their bookkeeping entries.

If reliable data from other companies were available, any insufficiency of expenditure for repairs and renewals would easily be shown up, and on the other hand, any company which had been making suitable charges against operating expenses for the upkeep of plant, would receive full credit therefor, and its accounts would be accepted as being all the more reliable by those on whom devolved the fixing of the price to be paid to the company.

*Of Morwick, Mitchell & Co. Chartered Accountant of Edinburgh, Scotland; Certified Public Accountant of Illinois.

PUMPING STATISTICS

Municipal Plants

Name of City	Make of Pumping Machinery	Description of Fuel Used: Kind (Bit., Anthr., Oil., etc.)	Description of Fuel Used: Av. Price per Gross Ton or Gal.	Description of Fuel Used: Per Cent. of Ash	Coal Consumed During 1907, Lbs.	Total Pumpage in 1907, Gallons	Avg. Head Pump'd Ag'n't: Static	Avg. Head Pump'd Ag'n't: Dynamic	Duty in Foot-Pounds per 100 Lbs. of Coal; No Deductions	Cost per Million Gallons Raised 1 Ft. High, Figured on Pumping Station Expenses
NEW ENGLAND—										
Auburn, Me	Worthington	Anthr	$6.50			106,000,000	110	116		
Augusta, Me	Deane	Bit.				42,827,040	148			
	Worthington	Electric.				10,795,127				
Concord, N. H.	Worthington	Bit.	4.85		499,668	269,855,754	207.4	214.3	94,898,476	$0.056
Dover, N. H.	Geo. F. Blake	Electricity				200,215,498				
	Lawrence Mach. Co Platt Iron Works	Bit.	5.10		280,669	69,459,687	168	180	37,151,549*	.121
Franklin, N. H.	Goulds, Ramsey, Deane (2)	None				76,382,500				
Manchester, N. H		Bit.	5.10		716,800	1,200,000,000	250†			
Milford, N. H.			4.25–4.50	10.5	342,000	35,137,375				
Portsmouth, N. H.	Worthington, Deane, Knowles	Bit.	4.20	8.25	2,000,000	620,500,000				
Somerworth, N. H.	Blake					137,909,739	87		23,007,174	
Burlington, Vt.	Worthington	Bit.	3.75		2,776,500	380,986,000	70	75	36,163,002	.074
Attleborough, Mass.	Deane, Barr	New River.			715,330	241,846,830		254,260	73,022,500	
Beverly, Mass	Holly Mfg. Co	Bit.		10.5	1,185,530	572,346,756	144.7		58,261,429	
Brockton, Mass	Barr Pump Co.	Bit.	4.55	11.18	2,148,375	813,235,915	202	295	93,131,055	.032
Brookline, Mass.	Worthington, Blake, Allis-Chalmers	Bit.			1,491,389	821,246,715		235	110,888,210	
Cambridge, Mass.	Leavitt,[2] Worthingtons, Blake	Bit.	4.60	13.5	5,182,450	4,038,875,720	158.6	190.4	123,728,812	.025
Chicopee, Mass	Deane, Gaskill	Bit.	4.25		1,241,000	576,669,194				
Danvers, Mass	Worthington	Bit.	5.15‡	9	919,202	337,556,152	174.2		53,371,780	
Fall River, Mass.	Worthington, Davidson.	Bit.	4.75	9.25	5,199,433	1,804,893,713		185	56,000,000	.05
FoxboroughDist.,Mass	Blake	Bit.	4.90‡		340,000	72,429,130			Never been figured	
Franklin, Mass.	Knowles, Deane	Bit.	5.00		550,000†	90,000,000	216	232		
Haverhill, Mass.	Worthington, Deane, Barr and Platt	Bit.	5.16	11.8	2,340,358	1,204,776,129	190	204	87,233,855	.0496
Lawrence, Mass.	High Service, Barr				296,068	1,195,362,942	294.7	324	87,705,632	.0844
	Low Service, Morris.	Bit.	5.53	7.79	2,400,002		152	185.9	71,297,223	.0727
Lowell, Mass	Worthington, Deane.	Bit.	5.22	13	8,400,000	2,000,000,000	156.4	164.3		
Marblehead, Mass.	Worthington, Deane.	Bit.	4.50		1,086,473	244,039,500	175	230		
Marlborough, Mass.	Blake, Worthington, Barr	Bit.,anthr§	5.25		314,600	218,364,000	165	175	Blake, 45 mil.. Worth., 79 mil.	.076
Maynard, Mass	Blake	Bit.	5.50		445,571	96,474,394	197	206	37,198,717	.115
New Bedford, Mass.	Leavitt	Bit.	4.60	7	3,111,875	2,728,552,272	167.8	184.6	134,977,328	.032
Newton, Mass	Barr, Worthington.	Bit.,anthr§	4.25	14	2,246,750	845,869,267	235	265	83,059,237	.042
Peabody, Mass.		Bit.	4.21			844,046,200	142.9	162.4		.0693
Salem, Mass.	Worthington	Bit.	3.92	11	2,433,211	1,227,173,120		125	61,799,761	
Stoughton, Mass	Knowles.	Anthr.			463,400	79,531,152	80–92			
Taunton, Mass	Holly, Allis.	Bit.	4.75		1,974,600	777,226,242				
Waltham, Mass.	Barr, Worthington	New River.	5.00	11.4	1,673,880	829,251,948	182	205	90,140,773	.051
Ware, Mass	Deane, Warren	Bit.	5.00		728,677**	139,877,290	221	244	39,108,601	.114
Webster, Mass.	Blake	Bit.	4.90		540,208	133,268,454	160			
Winchester, Mass		Oil			2,909††	31,724,160		127	11,588,070§§	
					331.4††	1,648,952		162	7,084,736§§	
Westerly, R. I.	Worthington	Bit.	4.84		1,505,100	264,982,500	195	210	30,834,200	.111
Woonsocket, R. I.	Worthington, Deane, Builders' Iron Foundry	Bit.	5.45	8.5	1,068,900	491,224,111	238.2	239.8	91,813,075	.046
Meriden, Conn.	Knowles, Builders' Iron F'y	Bit.	5.85‡		2,000,000†	666,634,000	194	240	110,000,000	.0523
Wallingford, Conn.	Knowles	Bit.	5.05‡							
MIDDLE ATLANTIC—										
Binghamton, N. Y.	Holly-Gaskill, Snow.	Anthr	$2.60	15	4,277,350	2,304,330,920	168.49		76,958,086	
Buffalo, N. Y.	Worthington, Holly, Snow, Lake Erie Engine Co	Bit., Elec	2.10 15.00[14]	8	94,798,200	44,816,892,520	144	159	62,690,946	Stm.,.035. elec.,.03
Cohoes, N. Y.	Holly, Goulds, Deane, Dayton.	Hydraulic					150	165		
Cortland, N. Y.	Worthington	Bit.	3.00		1,535,600	359,209,080	140	160	3,274,894	.024
Homer, N. Y.	Deane.	Bit.	3.10		360,000		299			
Ithaca, N. Y.	Deane, Worthington, Goulds	Bit.	3.00		5,074,000	586,000,000[3]	228	300	45,000,000	
Jamestown, N. Y.[2]	Allis, Holly, Dean, Gaskill	Bit	2.70		6,007,000	1,093,000,000	173	208		
Malden, N. Y.	Buffalo	Anthr	2.80		620,480	20,000,0000				
Newburgh, N. Y.	Worthington	Anthr	3.25		1,715,000		116	184		
Olean, N. Y.	Snow, Holly.	Nat. Gas				653,908,221	254			
Owego, N. Y.	Worthington	Bit.	3.25		1,200,000	233,000,000	196			
Peekskill, N. Y.	Holly, Fishkill.	Anthr	4.25		1,800,000	833,025,625				
Saratoga Springs, N. Y.	Gaskill, Holly	Anthr	4.75		2,202,400	933,551,100				
Burlington, N. J.	Holly, Worthington	Anthr	2.80	10	780,000	328,500,000				.30
New Brunswick, N. J.	Barr	Bit.	4.25		1,590,100	000,521,077	183			
Rahway, N. J.	Worthington	Bit	3.75	6.6	2,348,600	840,271,000	104		3,780,000	.122[4]
Pittsburg, N. Side, Pa.	Snow, Groshon, Allis, Wilson-Snider, Lowrie, Eppinger-Carpenter-Gould	Bit	1.92		111,020,040	19,894,728,384	75–205		68,000,000	
Bellefonte, Pa.	Worthington, Knowles[5]	Bit	2.25		50,000	400,000,000	218			
Erie, Pa.	Holly, Worthington	Bit.	1.75		11,778,764	4,326,096,848	213	98	76,912,427	
Harrisburg, Pa.	Barr, Harrisburg.	Anthr.[6]	1.25	13.66	13,070,437	3,970,549,750	200	235	59,540,800	.022
Meadville, Pa.	Worthington	Bit.	2.55		204,288	519,731,173	180	202	72,000,000	
Media, Pa.	Cassin, Wetherill.	Anthr	3.00			204,000,000	125			
Philadelphia, Pa.	Worthington, Holly, Morris, Wetherill, Southwark.	Bit., Anthr	3.00	25	467,223,680	116,882,212,622	185	206	50,000,000 155,000,000	.057
Pittsburg, Pa.	Allis-Chalmers.	Bit.	1.58		89,160,000	24,995,750,100	380		86,000,000	.0181
Reading, Pa.	Worthington, Allis-Chalmers.	Bit.	2.63	9.4	5,413,400	2,135,257,590	212.6	292.1	96,089,905	.021
Dover, Del.	Holly, Worthington	Bit.	4.25		896,000	73,000,000				
SOUTH ATLANTIC—										
Baltimore, Md.	Worthington	Bit.	2.87	8	29,669,343	11,267,344,254	105		66,000,000	
Salem, Va.	Dean.	Bit.	3.55		1,859,200	75,000,000	586 253			
Wheeling, W. Va.	Holly.	Nat. Gas.	10c. per M.		270,080M	6,094,701,600	292	310		.03
Edenton, N. C.		Bit.	4.00			12,775,000	207			
Augusta, Ga.	Ward.	Water pow.				2,984,017,344	158	174		.0135
Valdosta, Ga.	Ingersoll-Rand, Snow.	Bit.	3.60		1,679,000	99,342,240	246	254	50,256,000	.357
Gainesville, Fla.	Laidlaw-Dunn-Gordon.	Wood	1.92[16]		728 cords	80,000,000				
Jacksonville, Fla.	Worthington, Prescott.	Anthr.	3.61	20	4,890,000	1,105,344,031	150	160	31,600,000	.085

*Since Jan. 1, 1908, pumped 824 gals. per K.W.H. †Hydraulic pumping against 150 ft. head. ‡Delivered at pumping station §Anthracite screenings.
**Also 3,600 lbs. of wood.
[1] Includes 40 cents for hauling. [2] Private plant when built, acquired by city, 1903. [3] All water pumped twice and ⅓ pumped three times.
[4] Includes cost of filtration. [5] In addition to steam power, one 80 and one 14-h.p. waterwheel in use. [6] Anthracite dredged from Susquehanna River. [7] Water raised 130 ft by air-lift, 914 gals. per minute raised with an indicated h.p. of 104. Compressor is only half loaded. [8] Figure for each pump in order named.
Per h.p. [16] Per cord.

PUMPING STATISTICS

Municipal Plants

NAME OF CITY	MAKE OF PUMPING MACHINERY	DESCRIPTION OF FUEL USED			Coal Consumed During 1907, Lbs.	Total Pumpage in 1907, Gallons	AVG. HEAD PUMP'D AG'N'T		Duty in Foot-Pounds per 100 Lbs. of Coal: No Deductions	Cost per Million Gallons Raised 1 Ft. High, Figured on Pumping Station Expenses
		Kind (Bit., Anthr., Oil., etc.)	Av. Price per Gross Ton or Gal.	Per Cent. of Ash			Static	Dynamic		
OHIO VALLEY										
Barberton, O.	Worthington	Bit.	2.00	.....	2,382,470	305,206,000	.....	.....	.....	.....
Canal Dover, O.	Worthington	Bit.	1.53	.....	1,378,055	133,966,920	317	.....	.....	.....
Canton, O.	Worthington, Holly, Todd	Bit.	1.55	.....	26,174,400	2,010,426,763	233	325	120,000,000[8] / 140,000,000 / 157,000,000	.....
Carthage, O.		Bit.	2.85	.....	1,568,000	49,500,000	.....	160	50,000,000	.30
Cleveland, O.	Worthington, Knowles, Allis, Kilby, Holly	Bit.	1.953	.....	47,466,000	21,491,327,827	170.5	205	77,392,871	.0213
Coshocton, O.	Snider-Hughes	Bit.	1.69	.....	3,672,000	365,000,000	231	265	9,525,900	.13
Cuyahoga Falls, O.	Snider-Hughes	Bit.	2.25	.....	.....	36,500,000	175	.....	.....	.....
Dayton, O.	Holly	Nat. Gas	2.50	.....	8,793,520	2,751,303,815	.....	.....	35,000,000	.075
Delphos, O.	Laidlaw-Dunn-Gordon	Bit.	.....	.....	1,792,000	130,850,615	.....	.....	.....	.....
Eaton, O.	Gordon	Bit.	3.85	.....	510,000	39,736,552	.....	140	.....	.0065
Elyria, O.	Snow	Bit.	1.80	.....	4,086,760	762,892,704	276	294	113,900,000	.....
Gallipolis, O.	Laidlaw-Dunn-Gordon	Bit.	1.534	.....	1,366,760	107,718,761	.....	.....	.....	.....
Lebanon	Platt	Bit.	2.65	.....	150,000	59,000,000	.....	.....	.....	.....
Lorain, O.	Holly	Bit.	1.94	.....	463,908	1,425,000,000	.....	195	.....	.0457
Mansfield, O.	Laidlaw-Gordon	Nat. gas	.....	.....	.....	696,000,000	.....	.....	.....	.....
Marietta, O.	Snider-Hughes, Lawrence	Nat. gas	0.27 perM	.....	45,316M	900,000,000HS / 994,000,000LS	200 / 22	210 / 25	.....	.....
Oberlin, O.	Deane	Anthr.	3.50	.....	586,000	76,000,000	185	194	9,085,000	.43
Orrville, O.		Bit.	2.30	.....	1,346,240	118,625,000	.....	.....	.....	.....
Rockford, O.	Holly, Snow	Bit.	2.52	.....	6,778,360	1,316,394,492	.....	141	.....	.....
Sidney, O.	Gordon	Bit.	2.50	3.8	3,136,000	250,000,000	140	220	.....	.....
Springfield, O.	Holley, Allis, Todd	Bit.	2.30	10	4,466,129	1,477,781,460	195	.....	55,000,000	.0243
Toronto, O.	Platt	Nat. gas	0.15 perM	.....	.....	146,000,000	158	.....	.....	.....
Auburn, Ind.	Laidlaw-Dunn-Gordon	Bit.	2.72	.....	.....	190,996,000	.....	.....	.....	.....
Bedford, Ind.	Dean	Bit.	2.40	15	3,962,560	515,360,000	150	.....	.....	.....
Connersville, Ind.	McGowen, Roots Rotary	Bit., hyd.	2.95	.....	1,344,000	365,000,000	.....	.....	.....	.....
Evansville, Ind.	Holly	Bit.	1.50	.....	7,760,000	2,814,968,061	230	.....	.....	.....
Fort Wayne, Ind.	Holly, Worthington	Bit.	3.10	12	6,000,000	1,873,119,095	116	.....	60,000,000	.22 25
Goshen, Ind.	Holly	Bit.	2.60	.....	4,566,160	402,115,600	.....	.....	.....	.....
Hammond, Ind.	Worthington, Dunn-Gordon	Bit.	2.25	13	5,600,000	1,877,460,000	.....	.....	.....	.....
La Fayette, Ind.	Worthington	Bit.	2.40	.....	7,228,030	941,417,000	110	.....	.....	.....
Marion, Ind.	Fairbanks-Morse, Snow	Bit.	2.65	4	4,813,760	524,858,309	.....	.....	.....	.....
Peru, Ind.	Worthington	Bit.	2.65	.....	6,720,000	500,000,000	90	.....	.....	.....
South Bend, Ind.	Platt, Deane	Bit.	2.60	.....	7,851,200	1,760,966,531	.....	.....	.....	.....
Charleston, Ill.	McGowen	Bit.	.....	.....	2,240,000	220,000,000	.....	.....	.....	.....
Kewanee, Ill.	Buffalo, Norwalk Air	Bit.	2.10	.....	6,400,000	100,000,000[9]	300	.....	.....	.....
Paris, Ill.	Worthington	Bit.	2.45	.....	3,767,990	396,675,855	.....	200	.....	.125
Savannah, Ill.	Worthington	Bit.	2.80	.....	1,048,320	84,000,000	200	.....	.....	.....
Springfield, Ill.	Worthington	Bit.	1.35	.....	9,880,000	1,734,728,105	170	185	.....	.....
Covington, Ky.	Holly	Bit.	1.90	.....	5,985,300	1,118,157,581	160	.....	.....	.....
Henderson, Ky.	Allis	Bit.	1.25	18.28	2,306,000	561,000,000	170	270	128,000,000	.0425
Newport, Ky.	Holly	Bit.	1.90	.....	4,400,000	700,000,000	145	.....	.....	.....
Clarksville, Tenn.	Worthington, Herron	Bit.	1.85	.....	.....	456,000,000	.....	.....	.....	.....
Nashville, Tenn.	Holly, Worthington	Bit.	1.92	15	40,115,100	6,085,438,126	159	164	48,000,000	.....
Union City, Tenn.	Lane & Bodley, Deane	Bit.	2.00	8	2,097,200	116,800,000	108	34	.....	.20
UPPER MISSISSIPPI-MISSOURI—										
Albert Lea, Minn.	Deane	Bit.	3.90	.....	851,200	80,000,000	254	.....	.....	.....
Austin, Minn.	Smedley	Bit.	3.40	.....	1,352,000	148,350,000	.....	.....	.....	.....
Duluth, Minn.		Bit., anth. dust	2.62	.....	6,484,000	2,079,505,000	291	298	.....	.029
Mankato, Minn.	Gaskill, Holly, Knowles	Bit., anth.	2.50	20	1,680,000	285,885,000	223	237	.....	.....
Minneapolis, Minn.	Holly, Waters, Worthington	Sawdust and coal	3.64	.....	19,666,000	6,420,021,052	241	.....	75,000,000	.....
Moorhead, Minn.	Worthington, Blake	Bit.	5.97	9	780,000	73,005,000	.....	.....	.....	.....
Iwatonna, Minn.		.....	.....	.....	1,476,025	134,793,570	.....	.....	.....	.....
St. Paul, Minn.	Allis	Bit.	4.75	9.23	2,806,723	2,057,883,900	.....	.....	85,139,392	.....
Waseca, Minn.	Gardner Govenor	Bit.	2.00	12	3,660,000	.....	.....	.....	.....	.....
Winona, Minn.	Worthington, Allis	Bit.	2.87	.....	2,397,760	625,969,644	.....	.....	.....	.....
Battle Creek, Mich.	Blake	Bit.	4.70	6	1,375,991	458,000,000	115	115	31,000,000	.13
Bay City, Mich.	Holly	Bit.	2.70	.....	[10]	2,272,998,658	.....	113	.....	.....
Detroit, Mich.	Allis	Bit.	2.38	7.5	31,355,044	25,118,295,041	.....	130.7	87,342,185	.0242
Flint, Mich.	Holly	Bit.	2.50	.....	3,330,880	513,788,350	92 / 193	201	.....	.....
Grand Rapids, Mich.	Nordberg, Holly, Butterworth & Lowe	Bit.	2.72	12	15,923,948	5,391,954,585	75	152	50,584,000	.037
Greenville, Mich.		Bit.	2.95	.....	938,500	125,000,000	184	.....	.....	.....
Holland, Mich.	Platt, Laidlaw-Dunn-Gordon	Bit., elec.	2.95	.....	565,340[11]	244,096,395	115	150	.....	.267
Jackson, Mich.	Holly	Bit.	2.70	15	2,391,750	999,553,990	168	.....	70,000,000	.....
Ludington, Mich.	Holly	Bit.	3.55	.....	964,232	356,836,455	.....	.....	.....	.....
Manistee, Mich.	Holly-Gaskill	Bit.	3.70	4	638,000	302,266,460	.....	.....	63,000,000	.....
Marquette, Mich.	Holly, Worthington	Bit.	3.85	.....	2,954,000	830,766,100	200	.....	.....	.....
Mt. Clemens	Blake, Worthington	Bit.	3.40	10	1,934,000	287,000,000	.....	.....	.....	.....
Muskegon, Mich.	Holly	Bit.	3.00	10	2,641,000	1,064,215,142	115	100	33,592,051	.0818
Negaunee, Mich.	Worthington	Bit.	4.00	8	1,920,000	300,000,000	.....	.....	.....	.....
Owosso, Mich.	Gordon	Bit.	2.96	.....	1,281,291	15,390,367	19	114	.....	.....
St. Joseph, Mich.	Hughes	Bit.	2.35	.....	1,110,200	201,740,179	.....	.....	.....	.....
Ypsilanti, Mich.	Laidlaw-Dunn-Gordon	Anthr.	2.85	.....	235,000	198,881,400	90	96	.....	.....
Kenosha, Wis.	Barr, Laidlaw-Dunn-Gordon	Bit.	3.20	.....	2,400,000	1,095,526,162	140	.....	.....	.....
Madison, Wis.	Allis-Chalmers	Anthr.	5.25	15	2,205,500	531,987,000	201	231	55,695,828	.134
Wausaw, Wis.	Holly	Shavings	1.25	.....	2,190,000	578,000,000	.....	.....	.....	.....
Atlantic, Ia.	Holly	Bit.	1.85	25	3,670,000	182,500,000	150	.....	.....	.....
Boone, Ia.	Deane, Am. Well Wks	Bit.	2.90	.....	3,600,000	200,000,000	100	.....	.....	.....
Cedar Rapids, Ia.	Worthington	Anthr.	2.00	.....	6,700,000	913,000,000	.....	.....	.....	.....
Eagle Grove, Ia.	Am. Well Wks	.....	2.10	.....	720,000	12,000,000	100	.....	.....	.....
Eldora, Ia.	Dean, Smedley	Bit.	2.30	.....	1,440,000	24,020,000	.....	.....	.....	.....
Mason, Ia.	Laidlaw-Dunn-Gordon, Blake	Bit.	2.05	.....	1,570,000	132,330,330	.....	.....	.....	.....
Muscatine, Ia.	Holly, Worthington	Bit.	2.45	.....	.....	276,000,000	180	185	80,000,000	.....
Newton, Ia.	Snow	Bit.	1.75	.....	760,000	73,000,000	.....	.....	.....	.....
Grand Island, Neb.	Laidlaw-Dunn-Gordon	Bit.	4.15	.....	2,000,000	350,000,000	.....	.....	.....	.....
Hastings, Neb.	Am. Well Wks	Bit.	3.90	.....	2,680,214	124,015,510	.....	.....	.....	.....
Norfolk, Neb.	Strong	.....	.....	.....	900,000	46,187,920	.....	.....	.....	.....
Abilene, Kan.	Worthington	Bit.	3.50	.....	600,000	180,950,684	30	.....	.....	.....
Arkansas City, Kan.	Blake	Nat. gas	113 perM	.....	18,065,900	172,731,033	.....	65	.....	.....
El Dorado, Kan.	Fairbanks-Morse, Blake	Bit.	2.05	.....	1,200,000	91,125,000	190	.....	.....	.11
Fort Smith, Kan.	Worthington	Bit.	1.65	.....	6,600,000	400,000,000	.....	.....	.....	.35
Columbia, Mo.	Worthington	Bit.	2.40	.....	14,548,000	127,750,000	139	.....	.....	.....
Kansas City, Mo.	Allis-Chalmers, Todd, Holly	Bit.	1.40	12	47,715,367	24,077,181,216[12]	.....	342	.....	.0157
Kirksville, Mo.	Snow	Bit.	2.50	.....	500,000	7,300,000	550	.....	.....	.....
Macon, Mo.	Deane	Bit.	1.55	.....	1,750,000	.....	200	.....	.....	.....

[9]Water pumped twice, air lift and pressure pump. [10]Pumping station and electric plant run from same boilers. [11]Fuel burned keeping up steam for fire pump. [12]Three pumpings.

PUMPING STATISTICS

Municipal Plants

Name of City	Make of Pumping Machinery	Description of Fuel Used: Kind (Bit., Anthr., Oil, Etc.)	Description of Fuel Used: Av. Price per Gross Ton or Gal.	Description of Fuel Used: Per Cent. of Ash	Coal Consumed during 1907, Lbs.	Total Pumpage in 1907, Gallons	Avg. Head Pump'd Ag'n't: Static	Avg. Head Pump'd Ag'n't: Dynamic	Duty in Foot-Pounds per 100 Lbs. of Coal; No Deductions	Cost per Million Gallons Raised 1 Ft. High Figured on Pumping Station Expenses
Upper Mississippi—Missouri—Continued										
Monett, Mo.	Cooke Well Co.	Bit.	2.00	3	1,400,000	73,000,000				
Richmond, Mo.	Deane, Fairbanks-Morse	Bit.	2.50	10	730,000	23,725,000	296	359	9,722,797	.18
St. Louis, Mo.	Worthington, Allis-Chalmers	Bit.	1.58	20	114,122,640	26,681,562,820	293 202 50		68,768,900 77,935,300 27,593,400	.0244 .0207 .068
Lower Mississippi and Gulf—										
Guthrie, Okla.	Worthington, 3-stage centrifugal	Electric.				114,676,000	240			.354
Selma, Ala.	Snow, Rand air comp.	Bit.	2.80	15	2,286,500	288,502,000	140			.152
Meridian, Miss.	Knowles, Deane, Worthington	Bit.	2.60			494,786,000	150	161		.130[13]
Rocky Mountain—										
Cheyenne, Wyo.	Holly	Bit.	4.75		1,536,000	307,725,000		117		.135
Canon City, Colo.	Lannon	Semibit.	1.60		2,190,000	273,750,000				
Tucson, Ariz.	Nordberg, Platt	Oil.	10.20			720,000,000				.20±
Canada—										
Chatham, Ont.	Gordon	Coal.	3.82[16]		2,601,192		108.6[14]			
Lethbridge, Alberta	Allis-Chalmers, turbine	Electricity	1.17[18]			130,000,000	350	392		.13
London	Blake, Yates, Kelly, Northey hydraulic	Bit.	4.25		2,656,000	441,804,181[19]	242	242	39,922,064	.77
Montreal	Worthington	Bit.	4.44		41,400,000	9,304,445,192[20]	169	208	46,700,000	.055
Ottawa	Hall, Blasdell, Kerr	Water pr.				4,887,349,000	215			.125
St. Thomas	Worthington, Ingles	Bit.	3.15		1,998,080	443,521,605				
Saskatoon, Sask.	Canada F'y Co.	Bit.	7.00[21]	10			92			
Toronto	Blake, Worthington, Ingles	Bit. slack	3.00	9.90	34,400,160	10,356,547,168	212	237.3	80,000,000	.041
Windsor	Snow, Worthington	Bit.	3.40		2,762,400	1,630,977,832		157	115,000,000	.0938

Private Plants

New England—										
Biddeford, Soco, and Old Orchard, Me.	Deane, Worthington	Bit.			1,305,303	564,981,739	150	155		
Calais, Me.	Blake	Culm.	4.00		2,000,000					
Kennebunk, Kennebunkport, Wells and Ogunquit, Me	Deane	Cumb'r'l'd	4.90	7	735,422	171,043,716				
Bridgewater, E. Bridgewater, Mass	Worthington	Bit.	5.00			80,000,000±	218	228		
Fairhaven, Mass.	Snow	Anthr.	4.75	13		111,000,000				
Middle Atlantic—										
Brockport, Holly, Clarkson, N. Y.	Buffalo, Snow	Bit.			500,000	62,000,000	55–68	55–80		
Waterloo, N. Y.	Worthington	Bit.	3.00		1,363,000	146,000,000	130	135		
Moorestown, N. J.	Blake, Deane	Bit.	3.37		802,000	173,000,000				
Paterson, N. J.	Dixon	Anthr.					120	130		
Phillipsburg, N. J.	Gordon & Maxwell, Worthingt'n	Anthr.				400,000,000	290			
Easton, Pa.	Worthington, Corliss	Anthr.	2.60		3,806,000	931,944,000	303		65,000,000 40,000,000	
Gettysburg, Pa.		Bit.	3.85		600,000		276			
Sharon, Pa.	Worthington, Prescott, DeLaval		1.80			672,510,320	298	333		
South Atlantic—										
Raleigh, N. C.	Worthington, McGowan	Bit.	3.90		4,746,560	423,000,000	345			
Beaufort, S. C.	McGowan	Wood	2.50cd		500 cds	11,000,000	30			
Columbus, Ga.	Worthington, turbines	Electric.				456,250,000	200	230		.128
Ohio Valley—										
Conneaut, O.	Snider, Hughes, Laidlaw, Worthington, Doyle	Bit.			2,688,000	434,025,244	225			
Wilmington, O.	Platt	Bit.	1.10	25	9,112,320	52,925,000				
Xenia, O.	Gordon & Maxwell, Deane, Worthington	Bit.	2.35		2,313,920	189,860,000	240			
Elwood, Ind.	Deane of Holyoke, Stillwell-Bierce-Smith-Vaile	Bit.	2.80		2,284,800	273,750,000				
Linton, Ind.	Fairbanks-Morse	Bit.	1.11		4,391,340		185			
Richmond, Ind.	Holly	Bit.	2.65		2,214,300	746,535,900	80	80		
Rockport, Ind.		Bit.	.85	20	896,000	45,000,000	170			
Vincennes, Ind.	Deane of Holyoke, Worthington	Bit.	1.00	15	1,792,000	360,000,000				
Alton, Ill.	Allis, Murray, Laidlaw-Dunn-Gordon	Bit.	.85			1,095,000,000	100			
Belleville, Ill.	Worthington, McGowan	Bit.	.55	30	8,960,000	275,000,000				
Dixon, Ill.	Gordon & Maxwell	Bit.	2.00		2,688,000	182,000,000				
Freeport, Ill.	Knowles, Holly	Bit.	2.30		3,153,965	463,467,142	200			
Kankakee, Ill.		Bit.	1.55		5,500,000	698,611,200	60			
Lincoln, Ill.	Snow, Bethlehem	Bit.	1.30		2,089,920	208,064,416				
Hopkinsville, Ky.	Laidlaw-Dunn-Gordon	Bit.	1.75		2,500,000	110,000,000	235	256[22]	95,740	.121
Lexington, Ky.	Holly	Bit.	2.65		3,790,000	657,000,000		135		
Paris, Ky.	Deane	Bit.	2.50	9	2,016,000	208,306,500		160	20,000,000	
Upper Mississippi—Missouri—										
Watertown, S. D.	Deane	Bit.	6.50		300,000	80,000,000				
Stillwater, Minn.	Blake, Smedley	Bit.	4.00	20	460,000	150,000,000	100	104	70,000,000	
Grand Haven, Mich.	Walker	Bit.	2.85		700,000	76,000,000	75			
Iron Mountain, Mich.	Laidlaw-Dunn-Gordon	Bit.	3.50	10	1,600,000	182,000,000	85			
Manitowoc, Wis.	Worthington				2,400,000	372,000,000				
Burlington, Ia.	Holly, Murray	Bit.	1.85	12	5,573,400	681,617,420[23] 768,210,802		231–50	29,285,559	.0924
Iowa City, Ia.	Holly, Snow	Bit.	2.00		5,3 4,090	517,667,455			16,592,377	
Oskaloosa, Ia.	Holly	Bit.	1.35	9	3,084,000	301,011,100	160	80		.0105
Parsons, Kan.	Deane, Laidlaw-Dunn-Gordon	Oil and nat. gas.				450,000,000	75	85		
Clinton, Mo.	Deane	Bit.	2.75		2,760,000	171,311,700	80			
Mexico, Mo.	Pond	Bit.	3.12		1,527,600	114,620,375				
Lower Mississippi and Gulf—										
Ft. Smith, Ark.	Worthington	Gas[24]	.074[25]			892,777,503	139	196		
Decatur, and New Decatur, Ala.	2 Deane, 2 Laidlaw-Dunn-Gordon	Bit.	2.46			455,010,000				
Jackson, Miss.	Dean, Worthington	Bit.	3.60		6,048,000	912,000,000	180			
Weatherford, Tex.	Deane, Cook, Ames, Luitwieler	Slack.	3.45		4,928,000	36,263,000	85, 110			
Rocky Mountain—										
Boise, Ida.	Worthington centrifugal	Electricity				505,000,000	100			.1998
Mercer, Utah.	Worthington	Hydraulic				52,560,000	1732			.0454

[13] Includes pumping to filter and wash water. [14] Fire pressure 254. [16] Natural gas used now; 2,000,000 cu. ft. per mo. at 12c. per M. [18] Per K.W.H. [19] 807,414,352 gals. by hydraulic pump, cost $0.006 per mil. gals. 1 ft. [20] 3,135,443,553 gals. pumped by hydraulic power. [21] Delivered at power house. [22] Water pumped twice, once against head of 10 feet then against 246. [23] Upper figures amount pumped to city, lower to reservoirs. [24] Began using gas March 20; changed back to coal for two ten-day periods. [25] Per M. ft.

WATER WORKS DATA

MUNICIPAL PLANTS

In the column "Source of Supply" the terms given are in most cases those used by informants; but the word "Brook" is used to describe collection from a mountainous water shed by impounding or otherwise. In some cases where both pumping and gravity were reported it is probable that the direct-indirect system is used, although if this was known to be the case it was described as pumping only; in some cases pumping is for a high service only, in others for reserve supply. In naming kinds of pipe C.I. means cast iron; W.I., wrought iron; Gal., galvanized iron; Cem., cement lined; St., steel; Wd., wood; Ld., lead; T., tin; Lnd., lined. The figures given under "Cost of Repairs per Mile in 1907" may in some cases include all maintenance, although we have endeavored to eliminate this where possible.

Name of City	Source of Supply	Pumping or Gravity	Average Consumption		Distribution System—Main Lines								Distribution System—Service Connections								
											Gates							Meters				
			Per Inhabitant	Per Consumer	Kinds of Pipe	Sizes Inches	Total Length Miles	Cost of Repairs per Mile in 1907	Number of Leaks per Mile in 1907	Number of Hydrants in Use	Total in Use	Blow-off	Kinds of Pipe	Sizes Inches	Number of Service Taps	Average Length of Services, Feet	Average Cost of Services in 1907	Number in Use	Added in 1907	Percentage of Services Metered	Percentage of Consumption Metered	Motors and Elevators in Use
New England—																					
Auburn, Me.	Lake	Both	61	.....	C.I.	4 to 24	22	$1.40	0.2	126	408	10	Gal., Ld.	¾ to 2	2,800	100	.....	42	None	.....	Small	None
Augusta, Me.	Pond	Both	140	.....	C.I.	6 to 24	41.2	.....	.....	154	201	9	Gal.	¾ to 2	1,584	.....	.....	11	None	0.7	.....	5
Concord, N. H.	Lake	Both	.....	.....	C.I., Cem.	4 to 24	66.6	.....	.....	356	909	32	Tin Lnd.,Cem.	1 to 10	3,590	23.2	.....	1,493	57	41.6	41.6	10
Dover, N. H.	Pond, springs	Pumping	50	56	C.I.	4 to 16	27	.....	3.3	185	259	8	C.I.,Gal.,Cem.	1 to 6	1,938	34	$23.7	836	107	43	20	9
Franklin, N. H.	Springs, wells	Pumping	35	.....	C.I.	4 to 12	11	0.00	.....	108	134	1	Ld., Cem.	¾ to 2	577	.....	.....	700	15	100	100	None
Keene, N. H.	Lakes	Gravity	.....	.....	C.I., W.I., Cem.	4 to 24	41	1.35	0.5	251	395	31	C.I., Gal	¾ to 4	1,956	25	$9–$12	140	8	.....	.....	14
Manchester, N. H.	Lake	Pumping	45	550	C.I., Cem.	4 to 20	112	.....	.....	837	1,042	10	Gal., Ld. Lnd.	¾ to 2	6,300	25	15.00	4,670	153	75	.....	5
Milford, N. H.	Wells	Pumping	48	96	C.I., W.I., Cem.	2 to 10	7	.....	1.0	67	.....	.....	Cem.	4 to 6	510	.....	.....	174	.....	.....	30	2
Portsmouth, N. H.	Wells	Pumping	163	.....	C.I., W.I.	4 to 16	25	.....	.....	185	.....	.....	Gal.	¾ to 1	.....	18	.....	2,200	.....	6.5	.....	.....
Rochester, N. H.	Ponds	Gravity	75	105	C.I.	6 to 16	30.1	.....	0.13	178	.....	.....	Gal., Cem.	¾ to 4	1,407	30	7.00	126	14	9	.....	2
Somerworth, N. H.	River	Gravity	.....	.....	.....	2 to 16	.....	.....	.....	93	133	4	.....	¾ to 4	916	.....	.....	243	21	25	25	2
Burlington, Vt.	Lake	Pumping	50	51	C.I., W.I., Cem.	4 to 30	40	.....	.....	223	681	15	Gal., Ld., C.I.	¾ to 6	3,763	28	12.87	3,109	126	89	58	42
Montpelier, Vt.	Pond	Gravity	.....	.....	C.I., W.I.	2 to 24	25.7	.....	3	108	230	10	Gal.	¾ to 4	1,200	.....	10‡	None	.....	.....	.....	22
Rutland, Vt.	Brook	Gravity	.....	.....	C.I.	2 to 16	42	2.00	0.25	150	533	.....	Gal.	¾ to 6	2,650	25	.....	None	.....	.....	.....	2
Arlington, Mass.	Met. W. W.	.....	86	94	C.I., Cem.	4 to 12	36.2	3.31	11	376	309	6	Gal., Cem., C.I.	¾ to 6	1,929	20	14.69	835	183	43	25.5	5
Attleboro, Mass.	Wells	Pumping	44.2	47.3	W.I., C.I. Cem.	1 to 24	52.1	.....	1.15	384	.....	.....	.....	.....	1,961	.....	.....	1,972	97	.....	.....	2
Beverly, Mass.	Lake	Pumping	82.5	82.5	C.I., Cem.	1 to 24	71.37	19.03	1.5	377	671	.....	.....	¾ to 6	3,985	.....	.....	139	.....	.....	19.2	.....
Boston, Mass.	Met. W. W.	.....	157	.....	C.I.	2 to 48	750.2	.....	.....	8,142	9,761	.....	Ld., Ld. Lnd.	¾ to 4	93,942	29.25	.....	5,185	106	5.5	.....	702
Brockton, Mass.	Lake	Pumping	33.9	35	C.I., Cem.	6 to 30	103.69	4.28	0.453	909	1,268	46	C.I., Cem., Ld. Lnd.	¾ to 8	7,208	48.8	18.62	6,596	386	91.5	71.9	13
Brookline, Mass.	Wells	Pumping	.....	86	C.I.	6 to 24	85	.....	.....	645	.....	.....	Cem.	1 to 2	4,358	.....	.....	4,089	.....	100	100	24
Cambridge, Mass.	Brooks	Pumping	110	110	C.I., St.	2 to 40	129	15.43	20	1,052	.....	.....	Gal., Ld., Ld. Lnd.	¾ to 8	15,197	40	19.95	3,339	456	22	34	.....
Chicopee, Mass.	Brooks	Pumping	81	.....	C.I.	4 to 20	46	.....	.....	228	460	20	Ld.	¾ to 1	2,140	18	15.00	460	117	20	21	.....
Clinton, Mass.	Ponds	Gravity	.....	.....	C.I.	.....	34.7	2.50	0.4	265	.....	.....	Cem., Gal.	.....	1,876	.....	.....	1,409	33	.....	.....	.....
Concord, Mass.	Pond	Gravity	.....	.....	C.I., W.I., Cem., Wd.	1 to 12	32.76	4.20	0.305	177	176	17	Ld., Gal.	¾ to 1½	1,100‡	72.7	29.08 ††	21	2	.....	.....	4
Danvers, Mass.	Pond	Pumping	97	.....	C.I., W.I., Cem.	4 to 20	50	52.75*	1.06	250	297	15	Cem.	1 to 2	1,881	57.5	20.82	40	None	.....	.....	None
Fall River, Mass.	Lake	Pumping	43.93	44.52	C.I.	6 to 24	104.48	.....	.....	1,191	1,221	33	Gal., Ld.	¾ to 2	7,956	21	13.29	7,788	122	97	58	.....
Fitchburg, Mass.	Brooks	Gravity	75	90	C.I.	4 to 30	73.5	0.69	0.054	603	675	15	C.I., W.I.	¾ to 6	4,850	57	15.60	3,250	100	70	70	121
Foxborough Dist., Mass.	Wells	Pumping	.....	.....	C.I., W.I., Cem.	1 to 12	.....	.....	None	100†	.....	.....	Cem.	¾ to 1¼	525	....	11. ‡‡	230	7	40	.....	1
Franklin, Mass.	Wells	Pumping	55	60	Cem., C.I.	4 to 12	12	2	0.5	81	61	1	W.I., Cem.	1 to 1½	650	20	10	.....	.....	.....	.....	.....
Gardner, Mass.	.....	.....	.....	.....	C.I.	12	25	5	2	179	179	.....	Cem.	1	1,515	20	13.50	96	.....	.....	.....	.....
Haverhill, Mass.	Ponds	Both	122.30	134.15	C.I., Cem.	2 to 24	84	.....	.....	347	900	.....	Ld., W.I.	½ to 2	5,972	48.28	20	788	43	.....	.....	14
Holyoke, Mass.	Lakes, brooks	Gravity	99	102	C.I., W.I., L.L.	4 to 30	89.7	9.57	0.17	671	931	42	C.I., Ld. Lnd. T. Lnd.,Gal.	½ to 6	3,941	19.9	23.35 §§	328	10	8	32.68	127
Hudson, Mass.	Pond	Gravity	100	125	C.I., Cem.	4 to 18	25	8	.....	166	282	12	Cem.	1	1,052	.....	.....	41	40	4***	.....	None
Lawrence, Mass.	River	Pumping	45.0	45.6	C.I.	1 to 30	90.8	.....	.....	698	1,281	15	Gal., Ld., Ld. Lnd., C.I.	¾ to 10	6,970	40	21.57	6,220	199	89.2	55.7	19
Leominster, Mass.	Brooks	Gravity	.....	.....	C.I., W.I., Cem.	2 to 20	50.7	.....	.....	359	447	.....	Cem., Gal. T. Lnd., Ld.	¾ to 10	2,600	.....	.....	1,391	176	53.5	.....	.....
Lowell, Mass.	Wells	Pumping	55	55	C.I.	4 to 30	142	.....	.....	1,300	1,450	28	Lnd., Ld.,Gal.	¾ to 2	11,900	36	30	8,500	300	72	.....	None
Marblehead, Mass.	Wells	Pumping	.....	.....	C.I.	2 to 14	32.4	.....	None	325	330	9	Gal.	.....	2,025	10	.....	2,000	70	.....	.....	.....
Marlborough, Mass.	Lake, brook	Pumping	39.1	43.0	C.I., Gal.	1¼ to 16	38.13	0.70	.104	354	415	28	Cem.,Ld. Lnd., Ld., Gal.	¾ to 3	2,315	19	12	1,460	59	60	47	21
Maynard, Mass.	Pond	Pumping	45.5	48	C.I., Gal., Cem.	1 to 12	12	1.25	0.25	96	130	4	C.I.,Cem., Ld., Lnd.,Ld.,Gal.	¾ to 4	857	45	24.23	846	93	85	.....	2
New Bedford, Mass.	Lakes	Pumping	84	91	C.I.	4 to 36	111	8.05	.063	1,153	1,335	105	Ld., C.I.	½ to 10	11,107	35.5	23.59	3,196	393	29	33	176
Newton, Mass.	Wells	Pumping	60	60.6	C.I.	2 to 20	142.1	1.40	.04	979	899	400	Gal., Ld., C.I.	½ to 6	7,765	59	23	6,777	135	87.2	87	19
Northampton, Mass.	Brooks	Gravity	.....	.....	C.I.	3 to 24	65	.....	.....	336	Unkn	own	W.I.	¾ to 2	3,000	25	12.50	66	3	.....	25†††	15
Peabody, Mass.	Lake	Pumping	.....	185	C.I., Cem., Gal.	1 to 24	47.7	.....	1.3	344	.....	.....	.....	.....	1,636	.....	.....	.....	.....	.....	66	.....
Revere, Mass.	Met. W. W.	.....	88	.....	C.I., W.I. Cem.	2 to 16	42.6	5.17	1.29	152	336	4	Gal., Cem., Ld. Lnd.	¾ to 2	2,927	23	14.33	163	33	5.5	.....	None

Salem, Mass.	Lake	Pumping	88	.....	C.I., Cem.	4 to 30	65†	.....	.....	525	600†	18†	Ld. Lnd., Gal.	¾ to 1	6,850	.....	25.00	202	.....	.....	3	5
Somerville, Mass.	Met. W. W.	.....	90	90	C.I.	4 to 20	92‡	.....	0.163	1,022	1,404	136	Ld., Ld. Lnd., Cem.	½ to 6	11,662	34†	21.80	3,446	626	30	.....	9
Springfield, Mass.	Brook, Springs	Gravity	120†	125†	C.I., W.I., Cem.	1 to 36	160.42	5.54	0.15	1,134	2,599	.....	Ld., Cem., W.I. Gal.	½ to 8	11,385	.....	.....	5,632	782	50.8	27.6	313
Stoughton, Mass.	Ponds	Pumping	.....	.....	C.I.	4 to 12	23.75	5.49	.....	367	Unknown		W.I., Gal., Ld. Lnd., Ld.	¾ to 2	1,013	....	‡‡‡ 0.2177	604	46	.....	.....	None
Taunton, Mass.	Ponds	Gravity	68.5	74.7	C.I.	4 to 20	82.52	26.10	.206	886	628	60	Cem., T. Lnd., W.I.	¾ to 4	5,043	50	.....	2,388	85	47	40	21
Waltham, Mass.	Wells	Pumping	75	80	C.I.	4 to 24	54	3.50	.04	430	788	64	W.I.	¾ to 10	3,710	60	52.75	320	10	9	11.6	6
Ware, Mass	Wells	Pumping	44.5	45.6	C.I.	4 to 12	12.73	6.10	2	123	130	3	Cem.	¾	845	62.2	6.43	852	10	93	68.9	12
Watertown, Mass	Met. W. W.	.....	66.1	66.4	C.I., Cem.	4 to 16	37.7	6.60	0.11	335	431	13	W.I., Cem., Gal.	1 to 2	1,886	45.4	48.60	1,886	69	100	100	.....
Webster, Mass.	Wells	Pumping	36.47	.....	C.I., Gal.I.	1½ to 16	16	.....	1.0	131	.....	1	Gal.	¾ to 1¼	978	.....	.....	515	25	50	50	3
Whitman, Mass.	Lake	Pumping	.....	.....	C.I., Cem.	4 to 16	24	.....	.....	165	.....	.....	Cem., Gal.	1	1,335	.....	.....	.....	78	75	.....	.....
Winchester, Mass	.....	Gravity	.....	.....	C.I., Cem., Ld. Lnd.	2 to 24	30	5.00§	0.78§	279	.....	6	Ld. Lnd., Cem.	¾ to 2	1,724	25	10.50	350	32	.....	.....	5
Winthrop, Mass.	Met. W. W.	.....	117	117	C.I., Cem., W.I.	4 to 12	26.9	1.52	0.04‡	121	282†	4	Ld., Ld. Lnd., Cem., Gal.	¾	2,074	20	16.00	70	25	3	.....	3
Worcester, Mass	Brook	Gravity	66	69	.....	2 to 40	197.2	.....	.....	2,012	2,868	.....	.....	.....	.....	.....	.....	14,466	.....	.....	61	.....
Westerly, R. I.	Wells	Pumping	60	66	C.I.	4 to 16	34.09	.....	0.088	163	213	.....	Ld., Gal.	½ to 4	1,624	11.17	10.05	1,374	48	84.6	.....	9
Woonsocket, R. I.	Brook	Pumping	35	35	C.I.	4 to 20	53.77	3.67	0.09	630	557	15	Ld., C.I.	½ to 8	3,024	16.75	12.00	2,614	110	86	72.6	17
Meriden, Conn.	Brook	Both	100	110	C.I., Cem.	4 to 20	39	.....	.....	325‡	350‡	10‡	W.I., Gal.	½ to 6	4,200*	35‡	.....	300‡	25‡	7‡	.....	.....
New Britain, Conn.	Brook	Gravity	130	.....	C.I.	4 to 20	45	8.00	2	480	606	20	W.I., Gal.	½ to 8	4,300	20	.....	244	11	5	.....	46
New London, Conn.	Brook	Both	121	133	C.I. Cem.	4 to 24	65	7.30	3	357	497	34	Ld., Gal., C.I.	½ to 4	3,969	18	13.00	499	83	13	13	10
Norwalk, Conn	Stream	Gravity	250	.....	C.I , Cem.	4 to 16	60	.....	0.15	350	235	20	.....	.....	1,748	.....	.....	9	.....	.....	.....	.....
Norwich, Conn.	Brook	Gravity	.....	.....	.....	4 to 16	49.5	.....	.....	425	.....	.....	.....	.....	.....	.....	.....	172	71	.....	.....	.....
Wallingford, Conn.	Ponds	Gravity**	100	107	C.I., W.I.	2 to 18	28.2	.....	.....	96	Unknown		Gal., C.I.	½ to 6	1,331	.....	.....	94	6	7	25	.....
Waterbury, Conn	Springs, Brook	Gravity	108	139.1	C.I.	4 to 36	76.16	.....	.....	571	089	15	Ld., Gal., C.I.	¾ to 12	6,349	15	.....	1,294	147	20	20	42
Winsted, Conn.	Lake	Gravity	.....	.....	C.I.	4 to 24	26	.....	3	227	.....	.....	Ld.	½ to 1	1,270	15	.....	None	.....	.....	.....	20
MIDDLE ATLANTIC—																						
Auburn, N. Y.	Lake	Pumping	150	.....	.....	4 to 24	70	.....	.....	618	587	.....	.....	¾ to 2	.....	20	10.00	.....	300	.....	.....	.....
Binghamton, N. Y.	River	Pumping	137.2	.....	C.I.	4 to 24	82.5	.....	None	789	1,270	.....	W.I.	½ to 2	9,064	15	.....	1,771	293	19.5	19.5	10
Buffalo, N. Y.	River, Lake	Pumping	322	60	C.I.	4 to 48	517	13.00	.....	4,891	8,231	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....
Cohoes, N. Y.	River	Pumping	240	.....	.....	6 to 24	48	.....	.....	430	600	None	W.I., Gal.	¾ to 1	3,500	.....	.....	.....	.....	.....	.....	None
Glens Falls, N. Y.	Spring, Brook	Gravity	.....	.....	.....	4 to 8	67	.....	.....	328	171	62	.....	.....	3,300	.....	.....	2	.....	.....	.....	None
Gloversville, N. Y.	Spring, Brook	Gravity	100	.....	C.I.	4 to 18	34.48	.....	.....	296	420	.....	Ld., C.I.	½ to 6	3,524	.....	.....	297	.....	.....	.....	None
Homer, N. Y.	Wells	Pumping	33	333	C.I.	3 to 8	7.5	5.00	.....	52	52	.....	Gal.	½	300	.....	25.00	60	10	16	1	2
Hudson, N. Y.	Creek	Gravity	150	.....	C.I.	4 to 16	22.5	15.00	15	300	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ithaca, N. Y.	Springs	Pumping	100	700	C.I., W.I.	1 to 20	36.49	.....	.....	223	589	.....	Gal.	½ to 2	2,495	.....	.....	892	80	36	36	4
Jamestown, N. Y.	Wells	Pumping	110	.....	C.I., Gal.	1½ to 16	75.5	.....	.....	380	498	4	Gal.	½ to 1½	5,843	.....	.....	743	73	13	13	4
Johnstown, N. Y.	Spring, Stream	Gravity	150	.....	C.I.	4 to 16	33	.....	.....	172	306	21	W.I., C.I., Gal.	½ to 6	2,058	.....	.....	177	8	.....	.....	34
Kingston, N. Y.	Brook	Gravity	200	.....	C. I.	4 to 20	60	.....	.....	418	365	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lestershire, N. Y.	Wells	Pumping	200	1,000	C.I., W.I.	4 to 12	6	.....	.....	58	.....	.....	Gal.	½ to 4	800	30	.....	800	12	99	99	.....
Malone, N. Y.	Springs	Gravity	.....	.....	C.I., Cem.	4 to 12	30	.....	.....	101	454	14	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Middletown, N. Y.	Spring, Brook	Gravity	.....	.....	C.I.	4 to 24	41	.....	.....	327	340	.....	.....	.....	2,647	.....	.....	146	.....	18	.....	.....
Newburgh, N. Y.	Lake	Gravity	140	.....	C.I.	4 to 24	39	.....	.....	374	533	5	Ld., W.I.	½ to ¾	4,341	10	.....	165	10	4	.....	None
Olean, N. Y.	Wells	Pumping	36.27	250.15	C.I.	4 to 24	21.7	.....	.....	175	.....	.....	Gal., Ld.	½ to 2	2,175	.....	.....	300	.....	.....	14	7
Peekskill, N. Y.	Creek	Pumping	105	.....	C.I.	4 to 20	20	125.00	6	160	500	.....	Gal.	½ to 4	2,000	50	.....	1,500	100	75	75	10
Rochester, N. Y.	Lake	Gravity	79.8	79.8	C.I.	4 to 36	311.96	.....	.12	3,034	4,331	.....	Ld., C.I.	½ to 8	36,621	16	..	25,600	6,000	70	40	34
Rome, N. Y.	River	Gravity	250	1,200	C.I., Cem.	2 to 20	35	28.00	.....	292	300	6	.....	.....	3,100	.....	.....	.....	.....	100	.....	.....
Saratoga Springs, N. Y.	Springs	Pumping	150	.....	Iron	4 to 20	26.7	.....	.....	260	531	.....	Iron	⅜ to 4	4,000	25	.....	3,000	59	75	75	25
Syracuse, N. Y.	Lake	Gravity	100	98	C.I.	4 to 36	185	.....	.05	2,902	2,706	.....	C.I., Ld.	½ to 8	20,829	18	11.00‡	18,014	1,073	87	87	.....
Walden, N. Y.	Wells	Pumping	16.25	100	C.I.	4 to 8	7	12.50	.....	63	40	2	Gal.	½ to ¾	621	15	.....	619	31	100	100	None
Watertown, N. Y.	River	Pumping	.....	.....	.....	4 to 24	58	.....	.....	400	635	.....	.....	½ to 2	5,000	30	9.00	469	133	5	5	33
Whitehall, N. Y.	River	Pumping	100	.....	C.I.	2 to 12	8.5	102.47	28.6	82	24	7	.....	.....	612	.....	.....	155	20	.....	.....	7
Burlington, N. J.	River	Pumping	80	470	C.I.	6 to 16	10	.....	.....	130	120	3	W.I., Gal., Ld.	⅜ to 1	1,900	.....	.....	.....	.....	.....	.....	.....
New Brunswick, N. J.	Brook	Pumping	96	64	C.I., Cem.	4 to 24	46	47.00	.....	281	738	.....	.....	.....	3,898	.....	.....	538	121	40	40	6
Rahway, N. J.	River	Pumping	235	.....	Cem., C.I.	4 to 12	15.5	25.00	.....	153	110	.....	Gal., W.I., Ld.	⅜ to 8	1,350	.....	.....	160	125	9	33	10
Allegheny, Pa.	River	Pumping	201	.....	C.I., Steel	4 to 36	210	.....	44	1,853	.....	.....	C.I., Ld.	⅜ to 6	.....	.....	.....	100	.....	.....	.....	.....
Altoona, Pa.	Stream	Gravity	.....	.....	C.I.,	2 to 24	69.6	1.12	10	595	1,284	12	Gal.	½ to 2	11,774	.....	.....	465	49	4	4	7
Bellefonte, Pa.	Springs	Pumping	220	1,000	C.I.	3 to 12	14	2.00	None	71	40	.....	C.I., Gal.	½ to 8	800	.....	.....	77	6	10	10	10
Bradford, Pa.	Springs, Stream	Gravity	90	102	C.I.	4 to 24	36	1.23	15	258	.....	12	Ld., Gal.	½ to 4	3,991	15	20.00	105	29	2¾	10	2
Chambersburg, Pa.	Creek	Pumping	.....	100	C.I.	1½ to 12	17	.....	.....	118	.....	.....	Gal.	½ to 2	2,003	15	.....	105	20	.....	.....	.....
Erie, Pa.	Lake	Pumping	175	175	C.I.	4 to 42	125	.....	.2	820	1,691	10	Gal., C.I.	½ to 6	13,763	21.2	13.27	297	22	2.3	27.67	22
Harrisburg, Pa.	River	Pumping	148	148	C.I.	6 to 30	60.5	6.12	.10	794	1,477	6	Ld., W. I.	½ to 6	14,305	35	.....	8,400	748	75	75†	27
Knoxville, Pa.	Springs, Wells	Gravity	.....	.....	C.I.	3 to 8	3.5	14.00	.....	29	27	3	Ld., Brass, Gal	¾	170	25	.....	8	2	.....	.....	.....
Meadville, Pa.	Wells	Pumping	120	.....	C.I.	4 to 20	.....	.....	.....	161	299	3	W.I., Gal.	½ to 4	2,417	.....	6.50	949	220	33	.....	3
Media, Pa.	Creek	Pumping	.....	.....	C.I.	2 to 12	10	.....	.....	55	.....	.....	Ld., Gal.	½ to 2	750	.....	.....	15	1	.....	33‡	4
Philadelphia, Pa.	River	Pumping	201.7	.....	C.I., Steel	4 to 60	1558	95.54	.....	14,852	29,415	.....	Ld., W.I.	½ to 6	320,000	15	.....	1,726	None	.5	.....	2,529
Pittsburg, Pa.	River	Pumping	230	.....	C.I.	4 to 48	402	141.00	.51	3,753	.....	.....	Ld.	½ to 12	43,804	30	.....	6,563	90	14.98	.....	10
Reading, Pa.	Stream, Spr'gs	Pumping																				
		Gravity	127.3	127.4	C.I.	2 to 36	110	25.92	1.55	909	2,752	.....	I.d., C.I., W.I.	½ to 8	20.685	.....	.....	1,893	401	9.2	32.3	71
Renovo, Pa.	Creek	Gravity	.....	.....	C.I.	4 to 10	5.33	.....	.....	40	22	4	.....	.....	.....	.....	.....	None	None	None	.....	None
Shippensburg, Pa.	Springs	Gravity	95	.....	C.I.	4 to 12	16	1.00	.....	66	53	None	.....	.....	700	.....	.....	6	1	.....	.....	7
Dover, Del.	Wells	Pumping	30	40	C.I., W.I.	2 to 14	5	.....	.....	45	20	.....	Gal., Ld.	½ to 2	516	.....	.....	.....	.....	.....	.....	3
Milford, Del.	Wells	Pumping	.....	.....	C.I.	4 to 10	6	.....	.....	54	.....	.....	Gal., Ld.	½ to 2	298	35	.....	None	None	.....	.....	.....
SOUTH ATLANTIC—																						
Baltimore, Md.	River	Both	130	.....	C.I.	6 to 48	696.86	44.50	.....	2,760	.....	581	Ld., Gal., C I.	⅝ to 6	115,000	25	8.65	3,718	280	3.23	2½	.....
Fredericksburg, Va.	River	Pumping	.....	.....	C.I.	2 to 10	15	.....	.....	.....	80	10	Ld., Gal.	½ to 1	1,391	.....	.....	17	.....	.....	.....	.....
Marion, Va.	Springs	Gravity	.....	.....	C.I.	3 to 8	6	1.25	.....	450	8	7	Gal.	¼ to 1	450	75	.....	None	None	None	.....	None
Richmond, Va.	River	Pumping	120	781	C.I.	1½ to 30	114	.02	1	810	1,000	25	Ld.	½ to 2	17,500	30	7.00	9,405	1,181	53	53	2
Salem, Va.	Springs, Lake	Pumping	.....	.....	C.I.	2 to 10	8	10.00	1	104	104	9	Gal.	¼ to 1	780	30	7.50	12	.....	.....	.....	8
Piedmont, W. Va.	Stream	Gravity	.....	.....	C.I.	10	5	25.00	2	600	16	12	.....	1 to 10	.....	.....	.....	.....	.....	.....	.....	.....
Wheeling, W. Va.	River	Pumping	355	145	C.I.	3 to 30	45	.....	2	414	1,000	6	Ld., C.I.	½ to 6	9,000	.....	.....	60	18	.6	.6	252
Asheville, N. C.	River	Gravity	140	360	C.I.	4 to 16	.....	.....	.....	220	200	58	Gal.	¼ to 2	2,400	8	7.50	600	50	25	25	5
Edenton, N. C.	Wells	Pumping	10	300	C.I., W.I.	1½ to 8	5	.....	.....	25	40	.....	W.I., Gal.	½ to 1¼	112	35	5.00	2	1	5	5	None
Greensboro, N. C.	Creek	Pumping	80	100	C.I.	4 to 12	20	10.00	.....	200	150	.....	Gal.	½ to 1	1,500	15	.....	100	15	.....	.....	10
Greenwood, S. C.	Wells	Pumping	25	40	C.I.	4 to 10	10	.....	.....	58	.....	.....	Gal.	½ to 1	200	.....	.....	.....	.....	.....	90	.....

*Entire cost of maintenance of mains, gates and hydrants. †Estimated. §Cement-lined only; no leaks in C.I. pipe. ‡One leak, 2 ruptured cement-lined pipe. **Pumping in case of shortage. ††Lead only; gal. iron, cost, $23.26. ‡‡To property line. §§Up to 2-inch only. Including all sizes. $37.70. ***Entire system now being metered. †††Of income. ‡‡‡Per foot.

WATER WORKS DATA

MUNICIPAL PLANTS

Name of City	Source of Supply	Pumping or Gravity	Average Consumption		Distribution System—Main Lines							Distribution System—Service Connections.								
			Per Inhabitant	Per Consumer	Kinds of Pipe	Sizes Inches	Total Length Miles	Cost of Repairs per Mile in 1907	Number of Leaks per Mile in 1907	Number of Hydrants in Use	Gates		Kinds of Pipe	Sizes Inches	Number of Service Taps	Average Length of Services, Feet	Average Cost of Services in 1907	Meters		Percentage of Services Metered	Percentage of Consumption Metered	Motors and Elevators in Use
											Total in Use	Blow-off						Number in Use	Added in 1907			
Newberry, S. C.	Well	Pumping			C.I.	4 to 10	10.5			85			Gal.					206				
Americus, Ga.	Well	Pumping	68		C.I.	4 to 12	16			104	78		W.I., Gal.		879	40		227	24	26	28½	4
Augusta, Ga.	River	Gravity	137		C.I.	4 to 24	61.38			763	457	2	W.I., Gal., Ld.	to 2	4,036	25	$8.80	97	11			None
Valdosta, Ga.	Well	Pumping	30	40	C.I.	4 to 8	12	$0.04	1	77	43	1	W.I., Gal.	to 2	625	20	6.42	527	29	85	94	1
Gainsville, Fla.	Spring, well	Pumping			C.I.	4 to 10	11						Gal., Ld.	to 1	582			204		35		
Jacksonville, Fla.	Wells	Pumping	67.29		C.I.	4 to 20	60.6		.65	619	429	6	W.I., Gal.	to 4	5,376			3,555	436	66.1	66	2
Lanville, Va.	River	Gravity	39.69		C.I., W.I.	1 to 24	29.46			238	180		Ld.	to 2	2,425	20		2,350	172	100	100	2
Ohio Valley—																						
Barberton, O.	Wells	Pumping	80		C.I.	4 to 14	12		.08	112			Gal.	¾	1,000		7.00	30	10			None
Barnesville, O.	Brook	Pumping			C.I.	4 to 12	7.75		None	60	84	2	Gal., Ld.	to 4	186		8.00	178	70	98.9	98.9	1
Bryan, O.	Wells	Pumping	40	100	C.I.	4 to 12	7	11.75		69	41		W.I., Gal., Ld.	to 2	425	66	7.00	141	26	30	80	None
Canal Dover, O.	Wells	Pumping	61	333	C.I., W. I.	1¼ to 12	11			100			W.I., Gal.	to 1½	1,000		6.00	13	1			5
Canton, O.	Wells	Pumping	110		C.I.	3 to 20	64			518		28	W.I., Gal.	to 2	7,319	17	6.11	412	39	3		16
Carthage, O.		Pumping	86	100	C.I.	3 to 6	6		None	60	85	None			440	16	11.00	100	20			None
Cincinnati, O.	River	Pumping			C.I.	3 to 60	509.6		0.844	3,400					42,765		6.89	6,536	1,462	15.25		600
Cleveland, O.	Lake	Pumping	117.5		C.I.	3 to 48	689.9			8,152	15,236		Ld., Gal., C.I.	to 6	70,625	14		63,864	7,283	88.8		128
Clyde, O.	Wells	Pumping			C.I.	4 to 12	4			50	30	None	Gal.	¾	520	15	8.00	30	5			20
Coshocton, O.	Well	Pumping	90	110	C.I., W.I.	2 to 20	22.5		0.25	148	95	3	Gal.	to 4	2,334	16	5.65	45	2	2.5	15	10
Covington, O.	Wells	Pumping			C.I.	4 to 10	6			56	35		Gal.	to ¾	226	16	16.00	210	19	100	50	15
Cuyahoga Falls, O.	Wells	Pumping	22		C.I.	4 to 12	8		None	75	50	1	Gal.	to ¾	300		8.00	65	6			2
Dayton, O.	Wells	Pumping	60	377	C.I.	4 to 30	165	25.00	2	1,650	2,500		Ld.	to 8	20,434	26		18,500	1,500	92.5	92.5	100
Delphos, O.	Wells	Pumping			C.I.	4 to 12	16	None		84	84				850	27	11.00	806	44	16		202
E. Cleveland, O.	Lake	Pumping			C.I.	4 to 20	145.55	None	None	260			Ld.	to 1	2,143	21	16.00	1,750	356	100		None
Eaton, O.	Wells, springs	Pumping	27	40	C.I.	4 to 12	10	None		76	51	None	Ld.	to 1	562	25	11.20	302	15	55	55‡	10
Elyria, O.	Lake	Pumping	138		C.I.	4 to 20	42			245	133	6	Ld.	to 2	2,355	23	15.45	145	44			None
Gallipolis, O.	River	Pumping	55	82	C.I., W.I.	2 to 12	13.6		1	87	82		Gal.	to 2	965	22		572	10	66.66	66.66	8
Hicksville, O.	Wells	Pumping			Gal., Ld.	¾ to 4	4‡	50.00	4	36	18	None	Gal., Ld.	¾	300		8.00	300	12	None		20
Lebanon, O.	Wells	Pumping	46.18	215.52	C.I., W.I.	1 to 12	12	None	None	78	49	None	Ld., W.I.	to 1	693	8 to 36		39	9	5.63		1
Lorain, O.	Lake	Pumping	122		C.I.	4 to 24	50	9.34	.05	434	706		C.I., Gal.	to 2	6,000	18		1,781	283	29	32	21
Mansfield, O.	Wells, spring	Pumping			C.I.	6 to 14	60	None	None	267	322	4	Gal.	to 2	3,600	25	9.00	1,000	300	38	30	3
Marietta, O.	River	Pumping	180		C.I., W.I.	1 to 20	30		4	246	204	5	Ld., Gal.	to 2	2,200	20		100	10	5	5	20
Middletown	Wells	Pumping			C.I.	4 to 16	25			230			Ld.	⅝	1,170			187	90			
Niles, O.	Wells, river	Pumping			C.I.	4 to 14	20		None	110	60	2	Ld.	to 1½	750	30	16.50	40	5			None
Oberlin, O.	River	Pumping			C.I.	4 to 12	10.92		None	101	69	2	Gal., Ld.	to 4	980	22	13.50	744	72	92		None
Orrville, O.	Wells	Pumping			C.I.	4 to 10	6		None	45	26	1	W.I., Gal.	¾	413	20	7.00	392				34
Reading, O.	Wells	Pumping	12	300	C.I.	3 to 8	6.5	3.00	1	55	30	None	Ld.	to 1	202	35	15.00	102	15	50	50	None
Painesville, O.	Lake	Pumping	220	163	C.I.	4 to 14	23.5			126	135		Gal.	to 2				855	731	66.66	75	
Sidney, O.	Wells, river	Pumping	132		C.I.	3 to 12	12			116	95	4	Ld.	to 1	1,021	30	10.00					4
Springfield, O.	Wells	Pumping	80		C.I.	3 to 24	78			578	360	None	Ld.	to 2	6,500	15		600	50	5	20	20
Toronto, O.	River	Pumping	80		C.I., W.I.	2 to 8	15		None	93	220	1	Gal., Ld.	to 2	920	12.5	5.50	62	3	6	6	1
Versailles, O.	Wells	Pumping			C.I.	4 to 12	5	.82	None	37	18	2	Ld., Gal.	to 1½	210	20	6.30	1	None			
Wellsville, O.	River	Pumping			C.I.	4 to 18	18			106	285		Ld.	½	1,500			30	None			7
Auburn, Ind.	Wells	Pumping	104		C.I.	4 to 12	9.8		None	94	55		Ld.	to 2	585	25	7.91	None	None			None
Bedford, Ind.	River	Pumping			C.I., W.I.	2 to 12	17			100	74	1	W.I.	to 2	750	60		14	7			None
Brazil, Ind.	Wells	Pumping	50		C.I.	4 to 16	11	1.00		97			W.I., Ld.	to 2	700‡		8.50	300	260	33.3	33.3	
Butler, Ind.	Wells	Pumping	40	308	C.I.	4 to 12	4	20.00	4	46	12	None	Ld.	to 2	325	25	14.00	200	75	66.6	66.6	13
Connersville, Ind.	River	Pumping			C.I.	4 to 16	24			114	60		Ld.	to 1	800	18	9.00					4
Evansville, Ind.	River	Pumping	105.6		C.I.	6 to 30	82.25	6.00	0.44	563	798		W.I.	1 to 4	6,500	25	12.65	30	5		10	10
Fairmount, Ind.	Wells	Pumping			C.I., Ld.	4 to 12	4		None	40	6	40	Gal.	¾	400				None	None		None
Ft. Wayne, Ind.	Wells	Pumping	100	300	C.I.	6 to 24	100			750	750	6	C.I., Ld.	¾ to 10		10	10.00	2,000	50	25	25	
Garrett, Ind.	Wells	Pumping		200	C.I.	4 to 12	14		None	50	33	14	Gal., Ld.	to 1	700	35		None	None			50
Goshen, Ind.	Wells, creek	Pumping			I.	4 to 16	25.75			193	40		Gal., Ld.	to 2	1,800	30		719	125	50	50	5
Hammond, Ind.	Lake	Pumping			C.I., Ld.	4 to 24	65			256			Ld.	to 1	3,400	30						
Huntingdon, Ind.	Wells	Pumping			C.I.	4 to 14	15			254			Ld.	to 1	1,450	18	7.00	1,139	75	75		2
Kendallville, Ind.	Wells	Pumping			C.I.	4 to 12	10			65			Gal., Ld.	to 1	700			None				
La Fayette, Ind.	Wells	Pumping	119.5		C.I.	4 to 20	50.5	4.00	.05	329	423	None	Ld.	to 2	3,490	32	25.08	261	15	7.47		19
Marion, Ind.	Wells	Pumping	55	449	C.I.	4 to 20	37.25		None	305	202	None	Ld.	¾	3,200	14	10.50	422	71	8		90
Mishawaka, Ind.	River	Pumping			C.I.	3 to 12	18			140	100		Gal., Ld.	to 3	1,400	25		28	26	2		None
Peru, Ind.	Wells	Pumping	100	500	C.I.	6 to 16	24		None	221	100	6	Ld.	to 2	2,000	25	6.00	20	None	1	1	2
Rockville, Ind.	Wells	Pumping			C.I.	6	1.50		None	8	2		W.I., Gal.	¾	40				None			None
Whiting, Ind.	Lake	Pumping				6 to 10	20			110			Ld.	¾								
South Bend, Ind.	Wells	Pumping	87		C.I.	2 to 24	84			859			Ld.	½ to 3	9,830			889	152			
Charleston, Ill.	River	Pumping	48		C.I.	2 to 12	20	10.00		87		1			800			None	None			7
Kewanee, Ill.	Wells	Pumping			C.I.	4 to 10	17			200	140		W.I., Gal., Ld.	¾ to 2	900			900	90	100		
Ottawa, Ill.	Wells	Pumping	29.5		C.I.		27	4.50		169	169	4			1,250				31	100	100	2
Paris, Ill.	Brook	Pumping	108	1550	C.I.	2 to 12	18.20	20.00	2	180	18	1	W.I., Gal., Ld.	¾	800	30	8.00	10	4			
Savannah, Ill.	Well	Pumping			Kalamein	4 to 10	5			63			Gal.	¾	500	25			None			None

Springfield, Ill.	Ground[10]	Pumping	104	140	C.I.	4 to 24	85	3.00	.03	596	1,19[illegible]	3	Ld., C.I.	¾ to 6	6,246			834	34	14.5	18	None
Covington, Ky.	River	Pumping		49	C.I.	4 to 30	46	1.82	.09	382	694		Ld.	½ to 1	7,239	17	14.40	6,239	268	100	100	36
Henderson, Ky.	River	Pumping	90	89	[illegible]	3 to 24	27			181	222	5	Gal., W.I.	½ to 6	2,730	35	13.00	58	5	4.7	15	2
Newport, Ky.	River	Pumping	30	30	C.I.	4 to 24	36	20	.2	310	1,00[illegible]	10	Ld.	½ to 4	5,700	20	8.00	1,500	200	20	30	10
Bristol, Tenn.	Springs	Gravity	85		C.I., W.I.	1 to 20				55	5[illegible]			¾ to 12	1,000			12				
Clarksville, Tenn.	River	Pumping	100		C.I.	3 to 12	14.5			130	101		W.I., Ld.	½ to 1	75[illegible]			None	None			None
Jackson, Tenn.	Wells	Pumping	100		C.I., W.I.	2 to 16	36	7.22		250											5	
Nashville, Tenn.	River	Pumping			C.I.	3 to 36	115			97[illegible]	1,28[illegible]		C.I., Gal., Ld.	¼ to 4	12,[illegible]12	16		6,472	689	50		None
Union City, Tenn.	Wells	Pumping	45	63.2	C.I.	4 to 10	8	12.50	2	83	35	None	Gal.	½ to 2	75[illegible]	60		14	7			None
UPPER MISSISSIPPI–MISSOURI.																							
Deadwood, S. D	Streams	Gravity			C.I., W.I.	4 to 10	8		.03	73	None	None	W.I., Gal.	¾ to 2	630			None	None			1
Mitchell, S. D.	Wells	Pumping								57				4 to 10	250	40		250				2
Yankton, S. D.	Wells	Gravity			C.I., Wd.	4 to 10	10			54	63	2	Gal., Ld.	¾ to 1¼	700			None				
Albert Lea, Minn.	Wells	Pumping			C.I.	4 to 10	6		None	75	35		Gal.	½ to 1	650							
Austin, Minn.	Wells	Pumping	58		C.I.	3 to 12	13			95	76		Ld., Gal.	½ to 2	696	65		525	10	75		1
Duluth, Minn.	Lake	Pumping			C.I.	3 to 42	95	35.76		669			Ld. C.I.	½ to 6	6,286	21		2,338	93	37		25
Mankato, Minn.	Wells	Pumping	64	82	C.I.	3 to 16	16	None	None	161	99	3	Ld.	½ to 2	1,216			1,124	41	95	95	1
Minneapolis, Minn.	River	Pumping	61		C.I.	6 to 50	343			4,019	3,124	424	Ld.	½ to 34	2,656			22,700	1,800	95	95	25
Moorhead, Minn.	River	Pumping	40		C.I.	4 to 12	5.48	51.00	1.9	65	25		Gal., Ld.	½ to 2	1,048	60		236	26	90	90	None
St. Cloud, Minn.	River	Pumping			C.I.	4 to 16	15			152	45		Ld., Gal.	½ to 2	700			200	25			1
St. Paul, Minn.	Lake, Wells	Both			C.I., Cem.	4 to 36	298			2,773	2,509		Ld., C.I.	½ to 4	23,000	40	30.00	10,958	1,027			None
Waseca, Tenn.	Wells	Pumping			C.I.	6 to 12	8.75	None	None	42	22	None	Ld., Gal.	½ to 2	531	52		200	57	50	50	
Winona, Minn.	Wells	Pumping			C.I.	6 to 30	34	15.35		327	181	None	W.I., Gal.	½ to 2	2,700			1,200	500	40	40	6
Battle Creek, Mich.	Lake	Pumping	47	58	C.I.	4 to 16	49	95		508	413	1	Ld., C.I.	½ to 8	4,130	27	11.00	3,802	366	92	72	8
Bay City, Mich.	Bay	Pumping	138	200	C.I.	4 to 24	80	22	1.5	702	1,148	12	Ld., Gal., C.I.	½ to 8	4,000			1,477	165	37	15	
Detroit, Mich.	River	Pumping	164.2	166.7	C.I.	2 to 45	709.5	8.52	.127	4,646	8,238	800	Ld., Gal., C.I.	½ to 10	78,633			1,844	635	8.7	30.46	40
Flint City, Mich.	River	Pumping			C.I.	3 to 16	32.1			235	245	26	Gal., Ld.	½ to 8	2,360			12,000				None
Grand Rapids, Mich.	River	Pumping	140	190	C.I.	4 to 36	165	6	.20	1,574	1,656	5	Gal.	½ to 2	16,000			4,618	700	30	30	40
Greenville, Mich.	Wells	Pumping			C.I.	2 to 12	9			61			Gal., Ld.	¾	728	25	8.85	6				
Ishpeming, Mich.	Lake	Gravity	75		Wd.	4 to 14	27	26.85		136			W.I., Gal.	¾ to 1	1,898		12.00	1,394	50	75		None
Holland, Mich.	Wells	Pumping	66.8		C.I.	4 to 14	25	10.05	.25	233	252	5	Gal.	½ to 4	1,624	33		1,562	183	96	96	None
Jackson, Mich.	Wells	Pumping	79.7		C.I.	4 to 24	71.9			572	1,423	4	Ld., W.I.	½ to 6	4,767			1,116	49	25	25	301
Lapeer, Mich.	Wells	Pumping			C.I.	1½ to 10				100	100		W.I., Gal.	½ to 2	625							
Ludington, Mich.	Lake	Pumping	109	150	Wd., C.I.	4 to 16	16	39.52	1	170	119	10	W.I., Gal.	½ to 3	1,300			400	250	30	20	2
Manistee, Mich.	Wells	Pumping	59		C.I.	4 to 16	23.63			161	190	3	Gal.	½ to 2	1,679	25	8.00	148	12	8	8	1
Marquette, Mich.	Lake	Pumping	198.73		C.I.	2 to 20	21	4.29	.25	182	204	None	Gal.	½ to 4	1,780	30		650	200	33		2
Mt. Clemens, Mich.	Wells	Pumping	80	80	C.I.	4 to 14	20.5	5	2	196	202	None	Ld.	½ to 1	1,210	22	9.50	360	75	30	30	5
Muskegon, Mich.	Lake	Pumping	116	149.7	C.I.	4 to 24	51	7.41	108	582	328	15	Gal.	½ to 2	3,895	33		973	413	25	19.5	10
Negaunee, Mich.	Lake	Pumping	105		Wd., W.I.	1 to 10	18	15	2	82	45		W.I., Gal., Ld.	½ to 1	1,100	50	8.00	525	45	50	50	None
Niles, Mich.	Wells	Pumping	80		C.I.	4 to 14	30	3	3	170	300	10			930	30		275	10		40	10
Owosso, Mich.	Wells	Pumping	46.51	72	C.I.	4 to 12	24.6	14.40		151	169	6	Ld., Gal.	½ to 2	1,324		16.54	1,230	301	93.27	30	
St. Joseph, Mich.	Lake	Pumping			C.I.	4 to 12	10			130	50	10	Ld., Gal.	½ to 2	1,300	22		800	100	.75	.75	6
Ypsilanti, Mich.	Wells	Gravity	68		C.I., W.I.	1¼ to 16	25.3		3	172	284		Gal.	½ to 2	1,797	33	8.00	300	105	16.6	16.6	10
Kenosha, Wis.	Lake	Pumping	200		C.I., W.I.	2 to 16	34	150	8	256			Ld.	½ to 2	3,100	20	15.00	1,600	230	50	50	
Madison, Wis.	Wells	Pumping	53		C.I.	4 to 16	50	54.76		300	375	2	Ld.	½ to 1½	4,147	25	14.00	4,069	206	99	98	1
Wausau, Wis.	Wells	Pumping	68	200	C.I.	4 to 20	29	19.40	18	210	184	8	Gal., Ld.	½ to 6	2,300	25	16.00	50	18			12
Atlantic, Iowa.	Wells	Pumping	100		C.I., W.I.	2 to 12	13	None	None	115	82		Gal.	¾	1,000	40	10.00	30	30	3	3	None
Boone, Iowa.	Wells	Pumping	25		C.I.	4 to 8	12	10		170	105	3	W.I., Ld.	½ to 3	700	70	35.00	620	120	80	80	25
Cedar Rapids, Iowa	River	Pumping			C.I.	4 to 30	54			280	600	1	Ld.	½ to 1	4,300	60	20.00	2,000	300	50		1
Eagle Grove, Iowa	Wells	Pumping	15	100	C.I.	4 to 12	3			22	22		Ld., Gal.	½ to 2	175	50		155	30	92	90	
Eldora, Iowa.	Wells	Pumping	22	41	C.I.	3 to 6	3.5			30	11		Gal., Ld.	½ to 2	320			110	20	33	33	1
Fairfield, Iowa.	Ponds	Pumping	40			1 to 10	12			51												
Mason City, Iowa.	Wells	Pumping			C.I.	4 to 16	21	12	3	115	280		Ld., Gal.	¾ to 2	1,050	24		880	105	100		None
Mt. Pleasant, Iowa.	Wells	Pumping	13	192	C.I.	4 to 10	6.16			57	28	1			243			210	15	86	86	None
Muscatine, Iowa	Wells	Pumping	80		C.I.	6 to 16	19	10		196	416	2	Ld., Gal.	¾ to 2	1,500			100	None	5	5	
Newton, Iowa	Wells	Pumping			C.I.	4 to 8	14	None	None	73			Ld.	½ to 2	385			385	62	100		None
Oelwein, Iowa	Wells	Pumping			C.I.	4 to 6	8			54			Gal., Ld.		715			715		100	100	
Osceola, Iowa	Creek	Pumping			W.I.	6 to 8	4			24	21	1	W.I.		100		.6.00	100	25	100		46
Sioux City, Iowa.	Wells	Both	42		C.I.	4 to 16	68			367	355		Gal., Ld.	½ to 2	4,500			4,400		97		
Grand Island, Neb	Wells	Pumping			C.I.	4 to 10	20			99	50		Ld., C.I.	½ to 4	1,000			1,000	110	100	100	10
Hastings, Neb.	Wells	Pumping			C.I.	8 to 16			None	200	150	20	Ld.	½ to 2	1,800	50	7.50	1,800	115	99.9	100	5
Norfolk, Neb.	Wells	Pumping	41.5	209	Iron	4 to 14	8.6	10	2	93	23		Gal.	½ to 1½	498	65		313	41	66	66	None
Abilene, Kan.	Spring	Pumping			C.I.	1 to 12	15.75		None	80	40	2		½ to 1	850				40	30		None
Arkansas City, Kan.	Springs, Wells	Both	46.8		C.I.	4 to 12	15.55		None	184	88		Gal.	½ to 1	1,160	60	5.23	60	8	5	5	2
El Dorado, Kan.	Wells	Pumping	50		C.I., W.I.	2 to 12	9	4	1	69	34	1	Gal.	½ to 1½	400	150		200	75	50	50	10
Fort Scott, Kan.	River	Pumping	90	140	C.I.	4 to 16	25	20.00	3	1,700	195	15	W.I.	½ to 4	1,700			900	130	60	60	
Osawatomie, Kan.	River	Pumping			C.I.	2 to 10	7		None	54	20		W.I., Gal., Ld.	½ to 1	200			31	2			
Columbia, Mo.	Wells	Pumping			C.I., W.I.	4 to 12				69	30	None			798			448	112			4
Kansas City, Mo.	River	Pumping	71	97	C.I.	4 to 48	362			4,335	3,921		Gal.	¾ to 2	29,397			13,850	1,455	39	52	27
Keyport, Mo.	Wells	Pumping				4 to 12	11			102					686						80	
Kirksville, Mo.	River	Pumping			Kalamein	2 to 7	15		10	67	20		Gal., Ld.	½ to 1½				120	24	60	60	1
Macon, Mo.	River	Pumping	40		C.I.	4 to 10				36			Ld.	½ to 2	150	75		250		98	98	None
Monett, Mo	Wells	Pumping	40		C.I., W.I.	2 to 10	6	2.00	3	37	21	None	W.I., Gal.	½ to 2	600	30	8.00	80	50	16.6	16.6	
Richmond, Mo.	Wells	Pumping	14.5	216	C.I.	4 to 10	8			70	34	6	Gal., W.I.	¼ to 2	300	8		225			100	None
St. Louis, Mo.	River	Pumping	100		C.I.	3 to 48	813		.03	9,298	9,598	169	Ld.		87,734			5,420	168	6		
LOWER MISSISSIPPI AND GULF–																							
Guthrie, Okla.	Wells, River	Pumping	20	118		4 to 12	15			83	50	1			804			162		25		None
McAlester, Okla	Brook	Pumping			C.I.	6 to 16	6.5			150					866			625			75	
Perry, Okla.	Brook	Pumping			C.I.	4 to 10	7	10.00	0.7	40	6		Gal., Ld.	½ to 1	40	75				50		2
Mobile, Ala.	Creek	Pumping			C.I.	4 to 30	98.9			914	901				9,800			540	91			
Selma, Ala.	Wells	Pumping	50	689	C.I.	4 to 10	8.9	None	None	100	50	None	Gal.	½ to 1	1,160	30		1,680	85	93	93	None
Meridian, Miss.	Brook	Pumping	62	620	C.I., W.I.	1 to 16	29.3	8.75		196	204	4	W.I.	½ to ¾	2,200	20	10.00	900	450	42		1
Brenham, Tex	Brook, Wells	Pumping			C.I.	3 to 8	8			62	20				700			None				
Alexandria, La.	Wells	Air lift	60		C.I., W.I.	2 to 8	25			30			Gal.	½ to 2	1,200	15		450	50	40	40	

[10]Filter gallery.

WATER WORKS DATA

MUNICIPAL PLANTS

Name of City	Source of Supply	Pumping or Gravity	Average Consumption: Per Inhabitant	Average Consumption: Per Consumer	Distribution System—Main Lines: Kinds of Pipe	Sizes Inches	Total Length Miles	Cost of Repairs per Mile in 1907	Number of Leaks per Mile in 1907	Number of Hydrants in Use	Gates: Total in Use	Gates: Blow-off	Distribution System—Service Connections: Kinds of Pipe	Sizes Inches	Number of Service Taps	Average Length of Services, Feet	Average Cost of Services in 1907	Meters: Number in Use	Meters: Added in 1907	Percentage of Services Metered	Percentage of Consumption Metered	Motors and Elevators in Use
ROCKY MOUNTAIN—																						
Cheyenne, Wyo.	Creek	Both	135	....	C.I.	4 to 14	25‡	.....	.....	123	136‡	None	Ld.	¾	.....	30	.....	None	.....	.....	.....	6
Canon Cy., Col.	River	Pumping	190	760	C.I.	4 to 16	16	.....	.....	64	.....	None	Gal.	½ to 1	1,300	60	.....	1	None	.....	.....	5
Central Cy., Col.	Springs	Gravity	.....	.....	C.I.,W.I Wood	2 to 8	25	.....	.....	54	.....	.....	Gal.	½ to 2	450	.....	.....	35	None	.....	.....	.....
Colorado Springs, Col.	Brooks	Gravity	.....	.....	C.I., steel	3 to 24	120	.....	0.37	393	1,218	.....	.....	.....	10,975	.....	.....	146	30	.....	.....	.....
Greeley, Col.	Brooks	Gravity	.....	.....	C.I.,Converse	4 to 12	25	.....	.....	86	40	None	Ld.	¾ to ¾	1,200	38	.....	5	.....	.....	.....	7
Tucson, Ariz.	Wells	Pumping	1,000	1,200	C.I.	4 to 16	40	.....	.....	390	435	2	Gal.	¾ to 2	1,300	80	$12.00	None	.....	.....	.....	.....
PACIFIC COAST.																						
Bellingham, Wash.	Lake	Gravity	.....	340	C.I.,Gal., Wd., St.	4 to 30	56	$20.00	.....	149	.....	.....	Ld., Gal.	½ to 3	3,360	30	7.00	130	100	8	25	1
Port Townsend, Wash.	Brooks	Gravity	.....	.....	W.I.,St., Wd.	4 to 14	30	.....	.....	64	.....	13	Gal.	.....	494	20	10.00	15	10	3	.....	1
Santa Cruz, Cal.	Brooks	Gravity	.....	.....	C.I.	2 to 12	13.4	.....	.....	120‡	107	20	Gal., W.I.	¾ to 2	2,500	30	.....	40	.....	.....	2	8
Baker City, Ore.	Creeks	Gravity	.....	.....	W.I., C.I.	2 to 12	35‡	.....	2	133	245	3	Gal.	¾ to 2	1,000	30+	18.00	1,090	45	95	.....	10
The Dalles, Ore.	Springs	Gravity	200	.....	W.D., St. C.I.	2 to 14	25	.....	None	106	100	40	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oregon City, Ore.	River	Pumping	600	.....	C.I., W.I.	2 to 12	12	.....	None	75	.....	.....	.....	.....	600	30+	1	.....	.....	.....	.....	.....
Pendleton, Ore.	Wells	Pumping	100‡	.....	C.I., Conv.	2 to 12	13	.....	.....	80	90	4	Gal.	½ to 1½	1,000	75	.....	925	8	100	100	None
Portland, Ore.	Brooks	Gravity	100	.....	C.I.	4 to30*	235*	.....	.....	1,168	1,935	126	.....	.....	29,966	.....	.....	6,436	2,864	21.5	21.5	105
CANADA.																						
Chatham, Ont.	River	Pumping	82	410	C.I., Gal.	1¼ to 12	25.71	.....	1	189	237	6	Gal., Ld.	¾ to 2	2,000	30	7.74	849	146	42	42	9
Lethbridge, Alberta	River	Pumping	100	.....	C.I., Wd.	4 to 10	5.1	.....	1.5	58	.....	.....	Gal.	¾ to 2	550	50	25.00	14	3	3	.....	.....
London, Ont.	Springs	Pumping	77	.....	C.I.	4 to 18	90.6	1.75	0.1	572	505	10	Ld.	¾	11,578	70	16.48	276	14	2.38	2.38	13
Montreal, Que.	River	Pumping	107.24	.....	C.I.	4 to 36	239	.....	.....	1,733	3,146	.....	C.I., Gal., Ld.	¾ to 6	67,834	30	20.00	1,232	12	1.8	10	.....
Niagara Falls, Ont.	River	Pumping	.....	.....	C.I., W.I.	2 to 12	20	.....	3	110	100	None	Gal.	¾ to 2	1,850	20	6.88	4	None	.....	.....	.....
Ottawa, Ont.	River	Pumping	19.2	19.2	C.I.	3 to 24	112.89	25.50	.....	926	670	.....	Ld.	¾ to1½	15,951	30	24.64	41	10	.....	.....	.....
Regina, Sask.	Springs	Both	100	125	C.I., Wd.	6 to 12	19	.....	.....	145	.....	.....	Ld. Gal.	¾ to 2	645	65	.....	30	14	.....	5	12
St. Catharines, Ont.	Lake	Gravity	175	700	C.I., W.I.	4 to 30	39.7	.....	0.25	313	408	25	Gal., Ld., C.I.	¾ to 8	3,100	33	9.50	100	.....	.....	25	10
St. Thomas, Ont.	Creek, wells	Pumping	.....	.....	C.I.	4 to 14	26.5	.....	.....	165	.....	.....	Ld., W.I.	¾ to 2	3,182	33	.....	339	61	.....	.....	None
Saskatoon, Sask.	River	Pumping	†	.....	C.I.	6 to 12	4‡	.....	.....	18	.....	.....	Gal., Ld.	¾ to 6	100	30	.....	None	.....	.....	.....	None
Toronto, Ont.	Lake	Pumping	91.2	.....	C.I., St.	3 to 36	305.6	7.52	0.76	3,544	2,824	18	Ld., Gal., C.I.	¾ to 8	62,034	33	22.75	2,587	153	4.17	21	.....
Windsor, Ont.	River	Pumping	217	.....	C.I.	4 to 16	44.5	7.06	2	277	300	24	Ld.	¾ to 1	2,561	33	12.89	30	None	1	1	5

*Also 66 miles less than 4 inch. †Under construction.

PRIVATE PLANTS

NEW ENGLAND—																						
Biddeford, Saco and Old Orchard, Me.	River	Pumping	.....	.....	C.I.	6 to 20	50‡	.....	.....	169	132	.....	.....	.....	.....	.....	.....	158	.....	.....	.....	.....
Calais, Me.	Wells	Pumping	.....	.....	W.I.	6 to 12	28	.....	.....	100	.....	.....	Gal.	¾ to 2	1,500	.....	.....	12	.....	.....	.....	.....
Kennebunk, Kennebunkport, Wells, Ogunquit, Me	Brook	Pumping	.....	.....	C.I.	8	60	16.66	1	167	120	22	Gal.	¾	1,309	25	$12.00	15	6	.....	5	None
Bridgewater and E. Bridgewater, Mass.	Wells	Pumping	.....	.....	C.I., W.I.	4 to 10	27‡	.....	.....	105	80	5	Gal.	¾ to 1	946	.....	.....	137	.....	.....	.....	2
Fairhaven, Mass.	Wells	Pumping	.....	.....	C.I.	4 to 14	15	.....	.....	86	.....	.....	T. Lnd., Ld.	¾	675	.....	.....	.....	.....	60	.....	None
Hingham and Hull, Mass.	Pond, springs	Both	.....	.....	C.I., Cem.	2 to 14	57.5	14.44	1.16	248	.....	.....	Gal., Cem.	¾ to 2	2,347	.....	.....	25	3	.....	.....	None
Lee, Mass.	Brook	Gravity	.....	.....	C.I., Cem.	4 to 8	7	3	.....	30	18	.....	W.I., Gal.	¾	500	.....	.....	None	.....	.....	.....	2
Southbridge, Mass.	Pond	Gravity	.....	.....	C.I.	4 to 16	15	.....	0.2	97	.....	.....	Gal.	1 to 2	1,000‡	.....	.....	9	1	.....	.....	6
Ansonia, Conn.	Springs	Gravity	.....	60	C.I.	4 to 24	20	.....	.....	90	275	20	Gal.	¾ to 2½	.....	.....	.....	.....	.....	.....	.....	.....
New Haven, Conn.	Lakes, rivers	Both	150	.....	C.I.	6 to 24	200	.....	.....	1,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	.....
Rockville, Conn.	Lake	Both	.....	.....	C.I.	6 to 20	20	.....	.....	150	.....	.....	Ld., C.I.	¾ to 8	1,500‡	.....	.....	.....	.....	10	.....	1
Stamford, Conn.	Lake, river	Gravity	.....	.....	C.I.	4 to 24	55	.....	.....	170	.....	.....	.....	¾ to 6	3,000	.....	.....	750	300	25	.....	6
Torrington, Conn.	Streams	Gravity	.....	.....	C.I.	4 to 16	36	.....	.....	141	.....	.....	W.I., Gal.	½ to 2	2,000	.....	.....	66	3	.....	.....	.....
MIDDLE ATLANTIC—																						
Amityville, N. Y.	Wells	Gravity	35.6	.....	C.I.	4 to 10	9.5	.....	None	53	44	1	W.I., Gal.	½ to 1¼	225	100	.....	.....	.....	.....	.....	.....
Brockport, N. Y.	Wells	Pumping	.....	.....	.....	.....	7	.....	.....	74	59	4	.....	.....	837	.....	.....	335	.....	.....	.....	.....
Holley, N. Y.			.....	.....	C.I.	4 to 10	4	.....	.....	38	30	2	W.I., Gal.	¾ to 2	381	12	6.00	184	.....	.....	.....	1
Clarkson, N. Y.			.....	.....	.....	.....	1	.....	.....	3	7	.....	.....	.....	25	.....	.....	3	.....	.....	.....	.....
Cortland, N. Y.	Springs	Pumping	82	.....	W.I.	1¼ to 10	197	19.00	.....	179	162	.....	Gal.	½ to 6	1,400	.....	.....	830	71	50	.....	6
Oneonta, N. Y.	Creek, springs	Gravity	200	.....	C.I.	4 to 20	.....	.....	.....	105	260	12	Ld., Gal.	.....	.....	.....	.....	21	3	.....	.....	3
Owego, N. Y.	Wells	Both	200	.....	C.I., W.I.	2 to 12	16	50.00	10	76	50	None	W.I., Gal.	¾ to 2	922	35	.....	442	27	50	.....	6
Waterloo, N. Y.	River	Pumping	93	.....	C.I.	1½ to 16	9	6.00	2	58	40	2	Gal.	¾ to 1	546	50	10.00	5	2	.....	.....	3
Boonton, N. J.	Mt. Stream	Gravity	100	50	C.I., W.I.	4 to 14	13	10.00	1	66	27	4	W.I.	¾ to 4	520	35	.....	50	None	10	10	8
Moorestown, N. J.	Spring	Pumping	100	.....	Cem.	4 to 8	11	.....	.....	75	100	4	Ld., C.I., W.I.	¾ to 2	540	.....	10.00‡	2	.....	.....	.....	2
Paterson, N. J.	River	Pumping	83	87	C.I.,Cem,St	6 to 42	125	66.00	0.3	1,380	.....	.....	Gal., Ld.	¾ to 6	13,000	35	21.00	5,300	536	40	40	402
Phillipsburg, N. J.	River	Pumping	.....	.....	C.I.	4 to 16	.....	.....	.....	90	.....	.....	Ld., Gal.	¾ to 1	1,500	.....	.....	50	3	.....	.....	1

Easton, Pa.	River	Pumping			C.I.	3 to 20	30						Ld.	¾ to 1								
Gettysburg, Pa.	Mt. Springs	Pumping		40	C.I.	4 to 12	12			400	100	5	Gal.	¾ to 1				75	10	5	50	6
Mauch Chunk, Pa.	Springs, wells	Gravity	80	80	C.I.	2 to 10	11	2.00	2	55	106	15			1,060			2	2			4
Philipsburg, Pa.	Stream	Gravity			C.I., Cem.	2 to 16	35	3.00	1	60			Gal.	½ to 2	1,000		1.00	5	1	None	1	4
Sayre, Pa.	River	Pumping			C.I.	2 to 16	25			68			Gal.	¾ to 2								
Sharon, Pa.	River	Pumping			C.I.	2 to 12	35	4.95		214			Ld.	¾ to 1	3,410			804	185	15	15	6
Susquehanna, Pa.	Springs	Gravity			C.I. W.I.	1½ to 12	21			26	47		W.I., Gal.	¾ to 1	976			20	1			
Towanda, Pa.	Spring	Gravity			C.I., W.I.	1 to 12	25			66	75	15	W.I., Gal.	½ to 2	39c	20						9
SOUTH ATLANTIC—																						
Hagerstown, Md.	Springs	Gravity	25	125	C.I., Gal.	4 to 20	42	12.00		73	56	6	Gal.	1 to 4	2,36o	20		574	8	20	20	2
Clifton Forge, Va		Gravity			C.I.	4 to 12	20			45	50	6	W.I.	¾ to 2	95o	10	5.25	10	1			6
Raleigh, N. C.	Creek	Pumping	50		C.I.	4 to 14	22.5			169	143	5	Gal., Ld.	¾ to 2	2,000	22		500	51	25	25	10
Beaufort, S. C	Wells	Pumping		250	C.I.	4 to 8	3	None	None	15	8	2	Gal.	¾ to 2	150			15		10	10	
Columbus, Ga	Creek, river	Pumping	50		C.I.	4 to 12	28	2.00		163	102	None	W.I., Gal.	¾ to 6	1,900	50	18.00	1,270	74	66	66	8
OHIO VALLEY—																						
Conneaut, Ohio	Lake	Pumping			C.I.	4 to 16	20	3.00	3	154					1,700	16		1,400	80	40		2
Warren, Ohio	River	Pumping	67		C.I.	4 to 16	25.5			161	137	1	Ld.	¾ to 2	1,779			684	70	38		2
Washington C. H., Ohio	Wells	Both	43	63	C.I.	4 to 16	17		None	145	80		Gal.	¾ to 4	66o			200	None	30	50	77
Wilmington, Ohio	Wells	Pumping		66	C.I.	4 to 10	11			60	23		Gal.	¾ to 1½	300	25	12.50	280	125			
Xenia, Ohio	Springs, wells	Pumping	520	346	C.I.	2 to 14	21			200	122	3	Ld., Gal.	¾ to 2	1,500	25		50				5
E. Chicago, Ind	Lake	Pumping			C.I.	4 to 16				240		4	Ld., Gal.	¾ to 1	2,000	18	17.00	31	2			
Elwood, Ind	Wells	Pumping		75	C.I.	1 to 14	14.5			150	32		Gal., W.I.	¾ to 1	900	20	7.50	925	17	33	33	None
Linton, Ind	Wells	Pumping			C.I.	1½ to 12	13.6			73	54		W.I., Gal.	¾ to 1	850	23	7.00	50	9	5.2		
Noblesville, Ind.	Wells	Pumping	50	300	{C.I.,Gal {Ld.	4 to 16	14	10.00	1	104	100		Gal., Ld.	¾ to 2	700	10	10.00	75	10	10	10	1
Richmond, Ind	Ground	Pumping	97.4		C.I.	6 to 20	38	50		321	212	1	Ld.	¾ to 1	3,935	20	12.00	1,927	257	49	43.2	16
Rockport, Ind	Wells	Pumping			C.I.	2 to 10	6.5			37	30		Ld., Gal.	¾ to 1	350	30	12.00	4	None			None
Vincennes, Ind	River	Gravity	70		C.I.	1 to 18	24			215			Gal., Ld.	¾ to 2	1,200			100		10	10	4
Alton, Ill.	River	Gravity			C.I.	4 to 18	20			282	100		¾Gal.	¾ to 1	1,800			400	300	25		1
Belleville, Ill	Wells	Pumping	30		C.I., W.I	1 to 20	55			300	75	2	W.I. Ld.	¾ to 2	2,200	25		1,800	100	81	50	2
Champaign, Urbana, Ill.	Wells	Pumping	45		C.I.	4 to 12	32			305	140	6	Gal.	¾ to 4	3,000			2,600	250	90	90	5
Dixon, Ill.	Wells	Pumping			C.I.	4 to 12	20			182	30		Gal., Ld.	¾ to 2	1,300			150	20	12.5		2
Freeport, Ill	Wells	Pumping	66		{C.I. W. {I., Ld.	1 to 16	31.26			170	230	1		¾ to 2	2,800		10.00	1,314	125	47	17.4	19
Kankakee, Ill.	River	Pumping	100		C.I., W.I.	4 to 12	20			160	103	1	W.I., Ld.	¾ to 3	2,000	15	13.00	125	3			
Lincoln, Ill.	Ground	Pumping	47		C.I.	4 to 14	19.19	None	None	203	125	None	Gal., W.I.	¾ to 2	1,120	30	9.00	285	91	25	43	None
Mattoon, Ill.	Wells	Pumping			C.I.	4 to 12	15			149	75	None	W.I., Gal., Ld.	¾ to 3				300	50		35	
Sycamore, Ill.	Wells	Gravity			C.I.	4 to 10	14	.50	1	102	118	None	Ld.	¾ to 2	525	33	13.00	500	60			None
Catlettsburgh, Ill.	River	Pumping	200		C.I.	4 to 20				90	50	1	Ld , Gal.	¾ to 2		35	15.00				10	5
Hopkinsville, Ill.	Creek	Pumping	30	50	C.I., W.I.	2 to 12	13			224	38		Gal., W.I.	¾ to 2	1,150	15	9.35	440	64	26		3
Lexington, Ill	Creek	Pumping	45		C.I.	½ to 24	57		.05	526	406	4	Ld., C.I.	¾ to 4	3,200	20	14.5c	3,000	289	99	99	14
Nicholasville, Ill	Wells	Pumping	65		C.I.	4 to 10	4.5	7.00	11	50	13		Gal.	¾ to 2	149	40	15.00	39	6			2
Paris, Ill	River	Gravity			C.I.	6 to 12	10			108	50	4	Gal.	¾ to 2	790	15		40	3			8
Johnstown City, Ill.	Springs	Gravity	100	100		2 to 20	45			70	35	6			1,000			None	None			None
UPPER MISSISSIPPI—MISSOURI																						
Watertown, S. Dak.	Lake	Pumping	35		C.I.	4 to 12	13.5			120	92				813			400	90	60	60	1
Stillwater, Minn.	Lake, well	Both	100	150	C.I.	6 to 24	14.5		1	132	135	3	Gal.	¾ to 2	965	45+	25.00	None				
Grand Haven, Mich	Wells	Pumping	45	225	C.I. W.I.	4 to 12	6.5	None	None	55	45	4	Gal., Ld.	¾ to 2	600	20	7.75	550	32	10	10	None
Iron Mountain, Mich	Wells	Pumping		50	C.I.	6 to 16	18	5.00	1	175	180	None	Gal.	¾ to 1¼	1,500	50	25.00	555	20c	33⅓	33⅓	None
Eau Claire, Wis	Wells	Pumping			C.I.	4 to 20	32	5.00	0.5	378	300	3	Gal.	¾ to 2	2,100	30		41c	6	20		
Manitowoc, Wis	Wells	Pumping	78		C.I.	6 to 16	22.5		0.13	205			Ld., Gal.	¾ to 2½	1,650	35	10.50	950	65			None
Stevens Point, Wis	River, wells	Pumping			C.I.	4 to 16	12			144	40			¾ to 2½	700			70	None	10		3
Burlington, Ia	River	Pumping	67		C.I.	4 to 16	31.78			336	211	None	Gal., Ld.	¾ to 1	2,859	15‡	9.00‡	225	5	8	25.5	20
Council Bluffs, Ia	River	Pumping	84	653	C.I., W.I.	1 to 30	42			289			C I., Gal., Ld.	¾ to 6	4,500	20		1,20c	10c	25	25	12
Iowa City, Ia	River	Pumping	115	150	C.I.	4 to 20	16.5		None	204	101	4	Gal., Ld.	¾ to 2	1,485			None				10
Oskaloosa, Ia	River, wells	Pumping	82.5	520	C.I. W.I.	4 to 12	24		1	120	76	8	Gal.	¾ to 2	1,585	50	10.00	186	20	12	12	10
York, Neb	Wells	Pumping			C.I.	4 to 10	6		None	68	32		Ld., Gal.	¾ to 2	640			525	60	80	80	None
Argentine, Kan.	Wells	Both			C.I.	4 to 12	14			45				¾ to 1	500‡			None				None
Parsons, Kan.	River	Pumping			C.I.	4 to 16	26			125	50	1	Ld., Gal.	¾ to 2	1,900	70		1,156	11c	66	80	None
Pittsburg, Kan	Wells	Pumping	73		C.I., W.I.	1 to 12	31.5	9.11		225	177	None		¾ to 2							20	
Cape Girardeau, Mo.	River	Both	80		C.I.	4 to 10	10	2.00	1	90	45	2	Gal., Ld.	¾ to 2				67				3
Clinton, Mo	Wells	Pumping	78		C.I.	4 to 10	8		None	74	26	None	W.I., Ld.	¾ to 2	657			39	14	4	4	None
Mexico, Mo	Ground	Pumping	52.75		C.I.	6 to 12	8		None	76	90		Ld., Gal.	¾ to 2	400			50				
Nevada, Mo.	Wells	Pumping	50		C.I., St.	2 to 10	12			92		None	Ld., Gal	¾ to 2	500	30		50	7	10	10	None
LOWER MISSISSIPPI AND GULF																						
Ft. Smith, Ark	River	Pumping	100	200	C.I.	4 to 20	32.33	26.89		156	265	3	Gal., Ld.	¾ to 2	2,948			605	166	20	20	2
New Decatur, Ala.	River	Pumping			C.I.	3 to 24				215			Gal.	½ to 2				33		2		
Decatur, Ala.																						
Jackson, Miss.	River	Pumping				4 to 20	20	3.00		196	105	12		½ to 4	1,800	18		300	60			6
Weatherford, Tex.	Wells	Pumping	25	105	C.I., W.I.	4 to 10	9.9	40.00		24	24		W.I.	½ to 3	435	25	9.00	215	70	50	50	25
ROCKY MOUNTAIN—																						
Boise, Ida.	Wells	Pumping	76		W.I.	4 to 18				91	306	None	Gal.	½ to 2	2,700	20		1,055	45c	60	60	None
Mercur, Utah	Springs	Pumping			Steel	4 to 18	20	5.00	1	20	24	12	Gal.	½ to 4	600	50		2	None			
Ogden, Utah	River	Gravity			Kalamein	4 to 24	37			115					3,600							
Raton, N. Mex.	Lake	Gravity	16.5	158	C.I.	4 to 12	21.50	25.00		54	46	19		½ to ¾	950			264	4	27	27	None
PACIFIC COAST—																						
Napa, Cal.	Wells, river	Pumping	21	66.6	C.I.	3 to 14	20			73	53	3			1,700	26		900			10	None

NEWS OF THE MUNICIPALITIES

Divers Subjects of General Interest and Their Treatment by City Councils and Officials—Streets, Water Works, Lighting and Sanitary Matters—Police and Fire Items—Government and Finance

ROADS AND PAVEMENTS

Atlanta Would Be Best Paved City in the Country

Atlanta, Ga.—Given machinery and equipment for laying any kind of street pavement, together with a fair share of the labor of short-term prisoners now employed on county roads, H. L. Collier, Commissioner of Public Works, says he will make Atlanta the best paved city on the continent. The city, having continuous work in view, could afford to equip her department far better for the work than any contractor could do. Besides, the city has had to assume the responsibility of maintenance of pavements laid by contractors. Notice of defects have been received by paving companies and their bondsmen in silence. The city repairs the defect and a suit to collect the cost follows. The city loses, either on the ground that defective car tracks caused the damage or that water got into a plumber's cut and disintegrated the pavement.

To Build Road at Panama

Colon, Panama.—A complete system of macadam roads is being planned for the district and work on them is being pushed forward rapidly. The roads are divided in two general systems by the great lake to be formed at Gatun. The road from Colon to Gatun will be seven miles long and will be built at some distance from the railroad. In the vicinity of Panama, eight miles have already been built, four on the Sabanas and four in the neighborhood of Ancon and La Boca.

Plan Wanted for Rehabilitating Macadam

Madison, Wis.—In his annual message to Council, Mayor J. C. Schubert calls attention to the fact that the city has twenty-nine miles of improved streets, from fourteen to twenty of which need more or less extensive repairing, but do not require renewal. To finance this work will require a special tax upon abutting property or a fund raised by general levy. To do the work itself a granite or other suitable material for top dressing must be found, and for streets heavily traveled a bituminous binder of some sort which will keep water out of the pavement. The Mayor expresses the hope that the members of the Council will study this matter and succeed in arriving at a proper solution.

Vesuvian Paving Plant

Naples, Italy.—To avert the danger of an explosion of Vesuvius, should the volcanic vent become blocked, Signor Coastino proposes to afford an outlet for the incandescent mass contained in the crater by boring a tunnel at the base of the mountain and leading the molten lava into the sea. He suggests the possibility of running the lava into moulds which would shape it into blocks for building quays, breakwaters and the like, and into smaller paving stones for the streets of Naples, such as are now quarried in the very old and cool lava.

Pleads for Native Asphalt

Pittsburg, Pa.—G. R. Nulty, general sales agent for the Gulf Refining Company, Pittsburg, has issued a statement saying that current discussions incident to the Venezuelan controversy and the possibility of an embargo on the asphalt of that country fail to take account of the interests of American producers. California and Texas are now producing 150,000 tons of asphalt a year—as much as was annually imported about a dozen years ago—and they could supply all the asphalt needed for paving in the United States. So, Mr. Nulty says, there is no need to fear that the exclusion of Venezuelan asphalt would put American cities in the hands of the trust.

Hydraulic Mining in City Street

Seattle, Wash.—Work on the Jackson street regrading contract will, with the completion of the Connecticut street pumping station, be in full swing. The area to be excavated covers 68 city blocks, has a maximum cut of 100 feet, and amounts altogether to 3,500,000 cubic yards, of which 70 per cent. will be used in embankment and the balance disposed of by the contractor. The method employed is hydraulic sluicing. At present 6,000,000 gallons of water are used for the purpose, supplied by the old city pumping station on Lake Washington, now turned over to the contractor. The new station, newly completed, will supply 12,000,000 gallons at a pressure of 165 pounds a square inch. The plant consists of four Worthington fire stage pumps, electrically driven, with 10-inch discharge leading into one 24-inch main. Both the mains and the sluiceways are of wood.

SEWERAGE AND SANITATION

Police Engage in Sanitary Campaign

Alexandria, Va.—The sanitation of the city is just now receiving attention from the police. The latter have been instructed by Chief Goods to report all nuisances and violations of the health laws. Backyards, alleys, and other places are being rigidly inspected. It is the purpose of the health authorities to see that everything pertaining to the sanitation of the city is of the best.

Tracing Movements of Flies

Augusta, Ga.—In order to ascertain how far flies go from places where they may become infected with bacteria of diseases, Dr. Morgan of the Board of Health has had a flour paste spread in suspected places. Citizens finding these flies are invited to capture them and send them to the Board of Health.

Sewage Makes Much Trouble

Brockport, N. Y.—The Board of Health of the town of Clarkson, where Brockport's sewage disposal plant is placed, has notified Mayor Guelph to stop pumping sewage from its septic tanks into the creeks. It seems that a break occurred in one of the four septic tanks, due to the falling in of the roof. The tanks are so connected that one of them cannot be cut out for repairs, so that it has been necessary to empty all of the tanks and pump the sewage into the creek. It is proposed to build separate tanks for use in the future in case of accident.

Health Inspectors Chloroform Bugs

Galveston, Tex.—In order to test new germicide and insecticide made of formaldehyde and another chemical, Dr. Truehart, city physician, recently set his inspectors to work making a collection of subjects for experimental purposes. All the inspectors under his charge were sent out armed with bottle and choroform, nets, rat traps, and other paraphernalia necessary to the capture of rats and mice, and insects, including bedbugs, mosquitoes, moths, flies and ants.

Permit for Sale of Oysters Required

New York, N. Y.—The following addition has been made to the Sanitary Code: No oysters shall be held, kept, or offered for sale anywhere in the city of New York without a permit in writing from the Board of Health and subject to the rules and regulations of said Board.

Sanitary Conditions of Niagara Falls Investigated

Niagara Falls, N. Y.—Mayor Douglass has received from State Health Commissioner Porter a communication on the sanitation of Niagara Falls. The investigation was brought about by the high infantile mortality and typhoid death rate. The responsibility for these high figures could not be attributed to defects in the sewer system or bad or insufficient street pavements, nor defective garbage collection. The ice supply, though contaminated, is hardly sufficient to account for the conditions. Poor quality of milk is given as the cause of the high infant mortality and polluted water of the typhoid death rate.

Planning for Sewage Disposal

Pittsburg, Pa.—Much discussion of the sewage disposal problem is going on among city officials, owing to the realization of the fact that the State Health Commissioner has the power, at any time, to compel the city to cease dumping raw sewage into the rivers. A complete purification system would cost $10,000,000 or $15,000,000. Dr. J. P. Edwards, Superintendent of the Bureau of Health, favors the changing of the sewage system by stages and, as a beginning, advises a disposal plant for the nine-mile run district. He thinks that a number of plants would be better than a single one and that a gradual installation of these would satisfy the Commissioner.

WATER SUPPLY

Supply Decreases and Demand Increases

Dayton, O.—Owing to the filling up of old wells, Dayton's water supply is diminishing while the demand for water is increasing. Arthur Gensler has been engaged as consulting engineer to take charge of the cleaning out of the seventeen old wells, and, more particularly, to find suitable locations for new ones.

Wants a Filter Plant Like One at Lawrence

Dover, N. H.—Mayor M. J. White, Superintendent of Water Works Henry C. Perry and Members Herbert W. Owens, Walter J. Webb and Burnham Anson of the Dover Water Board, recently visited the filter galleries at Lawrence, Mass., with a view to installing a similar plant in Dover. With the party were Engineer W. F. Johnson of Boston and State Chemist H. W. Clark of the Massachusetts State Board of Health. The party was piloted over the plant, and the details of its operations explained by Caretaker D. J. O'Mahoney and Superintendent M. J. Collins. The visiting delegation expressed admiration at the efficacy of the plant and were enthusiastic in their praise of its efficient operation. Dover citizens are not satisfied with the purity of their water supply, and have in contemplation a campaign in the matter of providing better drinking water for the city.

Jersey City Sues Water Company

Jersey City, N. J.—An application has been made for a reopening of the suit brought to compel an abatement from the contract price by Jersey City against the Jersey City Water Supply Company, on the ground that the main pipe line is defective in that it lacks proper support where it crosses the Hackensack river. As the result of an examination of a break which occurred last October, the fact developed that the pipe under the river rests on silt, except for a short stretch near the westerly shore where the river bottom is clay. The break occurred where the clay leaves off and the silt begins. The contract called for a "proper foundation."

Water Supply Company Failed to Bid

Massillon, O.—Claiming that the Board of Public Service had incorporated in the specifications items which were not contained in the rate ordinance passed by the Council at a meeting some time ago, supposed to establish the terms under which the proposed contract was to be made, the Massillon Water Supply Company did not submit a bid in response to the Board's advertisement for tenders. The suggestion was made to the Board by representatives of the company that the specifications be drawn in strict accordance with the terms of the rate ordinance with a view to subsequent adjustment of items of minor importance about which the company and the Board did not agree.

Artesian Wells a Possibility for Minneapolis

Minneapolis, Minn.—Three years ago R. R. Betcher sunk an artesian well to a depth of 98 feet on his property in Bryn Mawr, where he built fifteen houses and has since supplied the families living in them with water. The stream is constant and the owner of the well believes it would supply several hundred families. From his investigations Mr. Betcher claims that water occurs in that suburb on three levels, the surface, 98 feet and 150 feet deep. He believes that a large portion of the supply for the city could be obtained from these streams.

New Projects in Jersey at a Standstill

Newark, N. J.—The refusal of the State Water Supply Commission to grant the application of Newark for the Kikeout Brook reservoir site, has caused no great disappointment to the city officials. The principal object of the application was accomplished, to prevent the East Jersey Water Company from securing the privileges. According to the decision of the Commission, no site can be secured by any company or municipality pending the establishment of the project for a comprehensive conservation of the State's water. Incidentally this will block efforts that might have been made by Paterson and Passaic for municipal works.

Niagara After Pure Water Supply

Niagara Falls, N. Y.—At one of the most enthusiastic and earnest meetings ever held in the Common Council chambers, the Aldermen approved and accepted a bill for the creation of a Water Commission which is given authority, subject to a popular vote, to approve and carry out plans for obtaining a pure water supply. There was not a man in the chamber who offered a word in opposition to the measure and even at the call of one of the Aldermen, who was desirous of learning of any opposition, not a man arose.

Must Have Meters or Bigger Plant

Pittsburg, Pa.—That the limit of the filtration plant will be reached in 1912 at the present rate of consumption of water, that it will be reached the moment city water is turned into the Southside mains, and that $12,000,000 must be spent in a period of ten years to double the plant's capacity, unless the loss of water is stopped, are some of the facts presented before the Pittsburg Board of Trade recently by E. E. Lampher, Assistant Engineer of the Bureau of Water. Figures presented by him show that of 230 gallons of water pumped daily per capita only 81 gallons are actually used with due economy. The only feasible remedy suggested by Mr. Lampher was the installation of a meter at every place where water is used. "Pittsburg," he said, " has set a low standard in prevention of waste of water. Only three other cities in the country during the past year pumped more water per capita, Allegheny, Buffalo and Camden, N. J. The average for 100 large cities is 137 gallons per capita." Mayor Guthrie has expressed himself strongly in favor of the use of meters in residences.

Cost of Lake Water Supply Prohibitive

Saginaw, Mich.—City Engineer Rolla M. Roberts has made an estimate for the Citizens' Committee on the cost of obtaining a supply of pure water from Lake Michigan. As it seems necessary for sanitary reasons to go from 20 to 40 miles after reaching the shore, it is figured that the total cost of the works would be about $5,000,000, a sum which is regarded as beyond the resources of the city.

State Health Officers on Sewage and Water Supply

Springfield, O.—State Health Officer C. O. Probst has made an exhaustive report on the water and sewer systems of Springfield. He points out the necessity of a sanitary sewer system and also says that Buck creek, from which the city derives a portion of its supply, by letting creek water into gravel deposits in conjunction with a system of underdrains, does not give adequate purification; therefore, he concludes that care should be taken that the waters of the creek are not polluted. To secure another source of water supply, the city will have to tap a large gravel bed not far from the present water works.

Temple Assumes Control of Water Works

Temple, Tex.—After a great delay experienced in arranging and agreeing upon all of the details connected with the matter, the city has formally assumed possession of the water works plant which has been heretofore operated by private parties. The plant will be improved with the proceeds of a bond issue recently placed.

Village May Get City's Filtered Water

Toledo, O.—The passage of the Bassett bill, which gives all cities power to contract with villages for furnishing water, will make it possible for Maumee, a suburb which lies ten miles north on the opposite side of the river, to obtain its supply from the Toledo works. When the filtration plant was first started, a committee from Maumee made several visits to Toledo in an effort to get that city to furnish them with pure water. Negotiations will now be resumed.

Waste from Defective Plumbing

Washington, D. C.—W. A. McFarland, Superintendent of the District Water Department, has found a leakage of 75,000 gallons a day in the Columbia Institute for Deaf Mutes. Nearly every spigot and flush tank were found to be leaking. The valve on the water supply to the swimming pool was losing 10,000 gallons a day, and a defective joint in a two-inch pipe to a duck pond was responsible for a loss of 16,000 gallons a day.

Consolidation Will Bring Cheaper Water

West New York, N. J.—Taxpayers who for four years have been fighting for cheaper water now see in the proposed consolidation of the North Hudson towns, which are so hedged in that the only outlets and inlets are through other towns, streets being the boundary lines, the opportunity which they have desired. Consolidated, these towns will be in a position to obtain water from Jersey City at the same rates offered to Hoboken. The present rate is $1.75 a thousand feet up to 5,000 feet and $1.45 for additional amounts. A bill was framed to compel the Hackensack Water Company to reduce the rate to $1 per thousand, but it was never even introduced in the Legislature as the Assemblymen told the members from West New York that they would not vote for it.

Use of Hydrants for Street Watering Forbidden

Gloucester, Mass.—At a meeting of the Board of Water Commissioners it was voted to notify the Superintendent of Streets that in the future the use of the hydrants to obtain water for watering the streets must be discontinued, and it was suggested that proper stand pipes be erected in certain parts of the city for this service.

STREET LIGHTING AND ELECTRIC POWER

Municipal Lighting System Considered

Brattleboro, Vt.—A movement for municipal electric lighting has been started and the Board of Trade is collecting data bearing upon the subject. While the question has been agitated before, nothing has come of it, as the expense of an entirely new plant was considered as too much of a burden for the town to assume. Very soon Brattleboro will be in a position to buy electric power of the Connecticut River Power Company for about $25 per horsepower per annum—about half the actual cost of steam. The local company, which has had no competition, although using water power part of the year, has charged more than twice as much for electric power as is charged in the neighboring city of Keene, N. H., where there are two companies operating with steam power plants.

Bill for Sale of Gas Companies

Boston, Mass.—A bill authorizing the purchase, sale and consolidation of gas or electric lighting companies was unanimously reported in the Massachusetts House of Representatives by the Committee on Public Lighting. The report was based on the recommendations of the Gas and Electric Light Commissioners contained in a special report to the Legislature. The bill provides that a gas company may purchase the franchise and property of another gas company where the mains are in contiguous municipalities, the same conditions applying also to electric lighting companies. Such purchase and consolidation, however, shall not be valid unless approved by two-thirds of the stockholders of each contracting company and must also meet with the approval of the Gas and Electric Lighting Commission. It is further provided that no electric lighting company may acquire the property of a gas company and no gas company can acquire an electric lighting company.

Would Johnsonize Lighting Plants

Fort Worth, Tex.—Judge George W. Armstrong, President of the Consumers Lighting and Heating Company, has made the city a proposition looking to the joint ownership of a holding company by the city and the interests represented in his company by means of which the cost of lighting may be reduced, a fair profit made by those now having capital in the enterprise and the unearned increment due to enhancing value of the franchise reserved to the city. He proposes the creation of a corporation, half of whose stock shall be owned by the city. The directors of the company would be selected half by the city and half by the private interests. Dividends would be limited to 8 per cent. The purchase or construction of a gas plant is also a part of the general plan.

Mayor Fights Gas Franchise

Lansing, Mich.—War on the Lansing Gas Company has been declared by Mayor Lyons. In a message to the Common Council the Mayor admonished the company for watering its stock, advising the Aldermen against any extension of the company's franchise and demanding that the company be required to comply with the terms of its contract with the city to furnish gas to consumers. The Council directed the City Attorney to take steps to secure compliance with the franchise. Extensive improvements started more than a year ago by the gas company have been held up because of the refusal of the Common Council to grant a new franchise. President C. H. Giest of the company says that his concern is at the end of its rope so far as the construction of the new plant is concerned unless a new franchise is granted. In order to complete the plant the company must sell bonds, and in order to sell these bonds it must have a longer term franchise. The franchise runs for sixteen years. This is not considered sufficient to enable it to sell securities.

Electric Franchise for Central Section of City

Louisville, Ky.—In order to secure the benefit of competition in electricity the city has passed an ordinance creating a franchise for maintaining wires and the sale of electricity in a certain central section of the city. Tenders have been invited for this franchise, but it is stated that no bid from the Louisville Lighting Company or the Kentucky Electric Company, which are already in the field, will be received. The price for lighting must not exceed eight cents per kilowatt, and for power four cents per kilowatt. Public street lights must be furnished at a price not to exceed $67 a year. The proposed plant must have a capacity not less than 450 kilowatts. It is expected that the proprietors of the Louisville Hotel will be one of the bidders.

Mayor Rejects Lighting Bill

Portland, Me.—Mayor Lane has refused to sign the warrant for the Portland Railway, Light and Power Company in payment of their monthly bill. He has instructed the City Executive Board to determine by investigation if the city is receiving the amount of light called for in the contract. Under the agreement, the company was to furnish arc lights of 2,000 candlepower capacity. More than a year ago the old arc lamps were discarded and magnetite lamps substituted. The Mayor believes they do not give the requisite 2,000 candlepower.

Right of City to Lease Equipment

Seattle, Wash.—R. L. Munson, a dealer in electric supplies, has filed a petition asking that the city be restrained from competing with him, alleging that the charter provision authorizing the city to furnish power does not permit a sale of fixtures and other material. The city has invested many thousands of dollars in motors which it leases and installs, and it is this branch of the business which is particularly objected to. Munson says that on account of its credit and large transactions the city can buy equipment cheaper than he can and that as the city leases it without profit, the competition is unfair.

Municipal Gas Plant Wanted

Two Rivers, Wis.—As the only plausible solution of the fuel problem it is now proposed to have a municipal gas plant established here. All fuel used in the city has to be shipped in by rail, which boosts the price so high that the poorer class of people are unable to buy it.

FIRE AND POLICE

Plan to Strengthen Fire Force

Jersey City, N. J.—The Fire Board is seeking authority to increase the Fire Department by adding 96 men to the force by sending one additional man to each of the 24 companies on December 1 next, and one man additional in each of the succeeding three years. This will place the companies on a 12-man basis, as they are in Newark. Besides, it is intended to organize one new company a year during the same period.

New Traffic Rules for Newark Police

Newark, N. J.—The Police Board has submitted to City Counsel Nugent a copy of the proposed ordinance for the regulation of traffic, which provides that all slow-moving vehicles shall keep as near as possible to the curb on the right side of the street, permitting vehicles moving faster to pass them on the left. When two vehicles meet they must pass each other on the right. A fast-moving vehicle must pass a slow-moving one going in the same direction on the left. In turning a corner vehicles must keep as close to the curb as possible if turning to the right. If turning to the left they must pass the center of the intersecting street before making the turn. No vehicle shall stop with its left side to the curb. Vehicles crossing from one side of the street to the other must do so by turning to left so as to head in the direction of traffic on that side of the street.

Liquor License Procedure

Lawrence, Mass.—The Police Commissioners are busy granting the annual liquor licenses. The procedure of the successful applicants is as follows: Those who were granted licenses by the Commissioners have to call at the Police Board office for a card which gives the name of the dealer, the location, kind of license and amount to be paid. These cards are taken to the City Treasurer's office, the money is paid, the card is signed, and when presented to the Clerk of the Police Board the licenses are given out.

Improved System of Fire Calls

Milwaukee, Wis.—A card index system, devised by Oscar D. Kleinsteuber, Assistant Superintendent of the Fire Alarm Telegraph, for the purpose of simplifying the work of getting out apparatus on second or third alarms, has been installed in the engine houses of Milwaukee. Each fire house will have a card for every numbered fire station. This card will indicate just what the company is to do on the first or additional alarms, whether it is to go to the fire or go to a different house. Altogether 30,000 cards had to be written up.

Police Complete Census of National Capital

Washington, D. C.—The complete returns from the recent police census of the District have been received by Major Sylvester. They show a considerable increase in the population since last year. In only one precinct has there been a decrease—the first. The total population is 339,403; white, 241,920, and colored, 97,483. The count last year was 329,591. The greatest increase is noted in the tenth precinct, which includes much of the territory north of Florida avenue. It is due to extensive building operations in the county. In one new subdivision the police recorded a population of 327 as against only four a year ago.

GOVERNMENT AND FINANCE

City Bills Will Be Paid in Order

New York, N. Y.—Comptroller Metz has put an end to the system which made it possible for favored contractors to have their bills passed without delay while others waited. Hereafter every claim arriving at the office will be marked with a time stamp and all bills will be paid in the order in which they are filed.

Utica Civil Service Rules

Utica, N. Y.—The State Civil Service Commission has approved resolutions presented by Utica Municipal Civil Service Commission reducing the minimum percentage of rating necessary to entitle an applicant to a place upon an eligible list from 75 to 70 per cent., and has returned without approval a resolution including in the list of positions for which competitive examinations may be held the position of Warrant Clerk. The State Commission holds that the position of Warrant Clerk could be filled either by appointment from the list of clerks or the list of bookkeepers.

Wholesale Removals of Employees

Boston, Mass.—Several of Mayor Hibbard's department heads made "clean sweeps" in their departments on the 29th of April, dropping more than 200 men. The removals were the greatest for any one day under the present administration, and broke all records since the Mayor Hart administration. The date for dismissals was chosen so that the names of the men on the weekly and monthly pay rolls would not appear in the annual pay roll book, which, under the city ordinances, contains the names of all employees on the rolls April 30. The pay roll book last year listed more than 13,000 names. It is the intention of the administration to show a cut of at least 500 from the official employees' directory of the Fitzgerald administration.

REFUSE COLLECTION

Waste Paper Nuisance

Clifton Heights, Pa.—For some time past many persons have been completely ignoring what is known as the "Nuisance Ordinance" in this borough by continually throwing waste paper, tin cans and other rubbish into the street. The different streets of the borough have of late become very unsightly by these practices. Then again there are circulars thrown in the streets or in yards which are in many cases blown into the streets. The borough authorities have determined to enforce the "Nuisance Ordinance," and fines will hereafter be imposed.

Night Garbage Work Expensive

Newark, N. J.—L. J. Buckley & Co., the city scavenger contractors, have submitted to the Street Committee of the Board of Works an estimate of what additional money would be needed for a system of night collections. With the understanding that the city would furnish lights for the dumps and that receptacles be put on the curb, the contractors agreed to perform the work for $8,056.25 per month, in addition to the present contract price of $10,741 per month for 1908. A second proposition, providing for the taking of receptacles from areaways or back yards in the residential section, from March 15 to December 15, would, the contractors stated, cost $3,145 per month in addition to the present contract price.

Pittsburg Garbage Plans Modified

Pittsburg, Pa.—As the result of a lengthy conference between Mayor Guthrie and Dr. J. F. Edwards, Superintendent of the Bureau of Health, the Sub-finance Committee of Councils will be urged to submit to the people a bond issue providing for the erection of two waste disposal furnaces at an estimated cost of from $160,000 to $170,000. The plan of Dr. Edwards, which has been "tentatively" approved by the Mayor, is to provide the furnaces one year and allow the waste to be brought to them by private enterprise, the following year to have a contract let for the collection alone of the waste and eventually to have the collection carried on by the city. The original plan for a waste disposal system prepared by Rudolph Hering, of New York City, called for an expenditure of about $360,000 for its installation. Dr. Edwards has reduced the first cost by more than half, confining it to furnaces alone. He laid before the Mayor evidence that it can be carried out according to his views of the matter. He plans to have one furnace placed on the site of the River avenue pumping station on the Northside and another in Junction Hollow, and he believes the two can be built for half the cost of the scheme proposed by Mr. Hering, of which the furnaces were only a part.

PARKS AND CITY BEAUTY

To Make Beach a Park

Atlantic City, N. J.—Beginning in the proceedings by which the city expects to spend millions to secure control of the beach front for park purposes was made by City Solicitor Wootton, who prepared papers asking for condemnation of the tract in front of the Hotel Rudolf, on which stores are now being erected outside the Boardwalk. Courts will be asked to appoint Commissioners to assess the value of the plot, already worth a large sum of money.

Improved Park System for Des Moines

Des Moines, Ia.—A meeting to promote the movement for an improved park system in Des Moines was recently held at the Commercial Club, and preliminary steps for adopting a definite plan of connecting the city's parks with boulevards were taken. The meeting was under the auspices of the Civic Improvement Committee of the club and a large number of guests were present. A beginning of the boulevard work was accomplished by the old Park Board.

Germans Select Site for Founder's Monument

Philadelphia, Pa.—Dr. J. C. Hexamer, President of the German-American National Alliance; Dr. Victor Leser, Hans Weniger, Henry Schwemmer, J. F. Ottenstetter and Carl Berger, a committee of the alliance, recently visited Germantown for the purpose of selecting a site for the $60,000 monument in Vernon Park to commemmorate the settlement of Germantown by Germans in 1683, the cornerstone of which will be laid on German Day, October 6. After going over the ground several times, it was decided to locate the monument in the large plat, about midway between what was once the old Wister mansion, and the Museum of the Site and Relic Society, and the Carnegie Free Library.

Monuments for Washington

Washington, D. C.—Within the next year or two at least a dozen mnouments or statues will be erected in public places in the city of Washington. In the matter of size and cost the Grant memorial will be the most important. The Columbus memorial will be erected in the plaza in front of the Union station. The architectural features of this have been prepared by Mr. Burnham and other architects of the Union station, but a number of artists will be asked to submit designs for the sculptural treatment. The general scheme is a semi-circular fountain with the figure of Columbus standing on the prow of a caravel facing the Capitol.

MISCELLANEOUS

Everybody Rides Free in Cleveland

Cleveland, O.—For the first time in the history of this city street car service was absolutely free on April 28, not a fare being rung up on any car within the city limits. This action was decided upon late the night before after the papers had been finally signed ending the long street car war in order that the occasion might be duly commemorated. It is proposed to celebrate the same date each year with free street car service. The entire street railway system of the city was operated by the Municipal Traction Company, the new holding company. Three-cent fare will, it is expected, go into effect within ten days. For three months thereafter a penny extra will be charged for a transfer. At the expiration of that time, however, free transfers will be issued.

Gives Money for Bathhouse

Madison, Wis.—T. E. Brittingham, through whose generous donation it was made possible to create Brittingham Park, has again come forward with an offer of a public benefaction. He proposes to give to the Madison Park and Pleasure Drive Association $7,500 to be used for the erection of a public bathhouse in 1909 at some point in Brittingham Park upon condition that the city pay over to the association $5,000 for the purpose of erecting in 1909, at some point along the water edge in the park, a bathhouse to accommodate the people in that section of the city.

Physicians' Vehicles Excepted from Traffic Rules

New York, N. Y.—An amendment to the traffic ordinance relating to exceptions in the case of speed of vehicles has been recommended as follows:

Nothing in this article shall apply to the apparatus and wagons of the Fire and Police Departments, the Fire Patrol, ambulances, emergency repair wagons of street railroads (and) vehicles carrying the United States mail, *and the vehicles of physicians while on emergency calls if the following conditions be complied with: that each such vehicle have on the rear thereof the name and address of the physician owning or using it; that in the day time each such vehicle be designated by a white flag with a red cross, and in the night time by a white light with a red cross on front and back.*

To Publish Annual Tax Lists

Jersey City, N. J.—The Jersey City Board of Trade has requested the Board of Finance to avail itself of the option given by a recent Legislative measure, and hereafter publish the annual tax list in pamphlet form for general distribution.

LEGAL NEWS

A Summary and Notes of Recent Decisions—Rulings of Municipal Interest

PAVING CONTRACT—EXTRAS

Fullerton et al. vs. **City of Des Moines.**—A paving company made a written proposition to repave certain streets, which contained an offer to furnish "sheet asphalt pavement on old concrete foundation per square yard, $1.40. For extra concrete per cubic yard, $4." In the contract subsequently entered into the company agreed to perform the work for $1.40 per square yard, "which shall be in full compensation for the cost of the entire work," and that the city should not be liable "for extras of any kind." The contract also provided that it could only be changed by a writing signed by the Board of Public Works and the City Engineer and approved by the Council, but the Board and the Engineer might order changes for which reasonable compensation should be allowed. The specifications of the contract made it the company's duty to bring the street to the proper subgrade, and lay a concrete foundation for the asphalt surface. Held, that, in the absence of fraud or satisfactory showing of mutual mistake, the contract will not be reformed so as to allow the paving company to charge $4 per cubic yard of concrete used in bringing the old foundation up to the required height in addition to the contract price of $1.40 per square yard.—Supreme Court of Iowa.

SEWER CONSTRUCTION—STATUTORY PROVISION

Bennett et al. vs. **City of Emmetsburg et al.**—The Code provides that the notice to bidders for a contract for sewer construction shall state as nearly as practicable the extent of the work and the kind of material for which bids will be received, when the work shall be done, the terms of payment and the time when proposals will be acted upon. Held, that a notice stating that sealed proposals would be received at the office of the City Clerk until a stated date for furnishing material and constructing a sewer, according to plans and specifications on file in the City Clerk's office, the sewer to be constructed of vitrified sewer pipe, payment to be made in special assessment certificates, and then stating the estimated number of lineal feet of each of four separate sizes of pipe, and the number of flush tanks and manholes, was not a compliance with the statute. Held, that the statute was mandatory, and was intended to avoid favoritism and secure the most liberal bidding on works of public improvement; and hence a noncompliance therewith resulted in a failure of jurisdiction. The expression "extent of the work" means more than a bare statement of the length of the sewer, the size of the pipe, the number of manholes and flush tanks, and includes some definite information, without which an intelligent bid could not be submitted, respecting the condition under which the work is to be done, and the manner in which it will be required to be done.—Supreme Court of Iowa.

REFUNDING BONDS—METHOD

Jordan vs. **City of Greenville.**—The Constitution, 1895, provides that nothing therein contained shall prevent the issuing of bonds to an amount sufficient to refund any bonded indebtedness existing at the time of the adoption of the Constitution. Civil Code, 1902, provides that any city, etc., may issue bonds for the purpose of refunding or paying the whole or any part of its bonded indebtedness existing at the time of the adoption of the Constitution, whether matured or not. Held, that a city may issue bonds to refund a bonded indebtedness existing at the adoption of the Constitution of 1895 without submitting the question to a popular vote.—Supreme Court of South Carolina.

MAINTENANCE OF PAVEMENT—RESPONSIBILITY

Bradshaw, et al. vs. **City of Jamestown, et al.**—Where a city charter required the cost of the original pavement only to be paid by the abutting property owners, leaving the city to bear the expense of repairing it, a contract which required the contractors to make repairs for 10 years necessitated not only by defective material, etc., but by the action of the elements as well, placed the burden of maintaining the pavement on the property owners, and was therefore void, in the absence of evidence that with proper construction and material the original pavement would last for the period covered by the guaranty. The burden of proof was on the city to show that, with proper construction and material, the original pavement would last for the period stipulated in the contract.—New York Supreme Court, Appellate Division.

STREET RAILWAYS—POLICEMEN AS PASSENGERS

Gabbert vs. **Hackett.**—The action was for personal injuries. It appeared that the plaintiff, a police officer, entered a street car in good faith believing that he had a right to ride free, and was permitted to ride because of a custom based on an ordinance requiring the free transportation of policemen and firemen. The court trial rendered a judgment in favor of the plaintiff, and this judgment was affirmed by the Supreme Court, which held that the plaintiff was a passenger, even if the ordinance referred to was void under the law prohibiting the granting of free transportation. The court lays down the rule that one who enters and takes passage in a street car with the consent of the company and does not refuse to pay fare, is not a trespasser, and that the mere failure to pay fare does not deprive one riding on a street car of his rights as a passenger, nor does it convert his relation to the carrier into that of a mere licensee.—Supreme Court of Wisconsin.

IMPROVEMENTS—CURATIVE STATUTES

Haggart et al vs. **Kansas City et al.**—Proceedings under an ordinance relevying an assessment for a public improvement were perpetually enjoined on the ground that the ordinance was unconstitutional, but the language of the judgment was ambiguous. Subsequently a second relevy was made under another ordinance, and an action was brought to enjoin the collection of the reassessment. Held, that the judgment in the former case must be interpreted with reference to the issue then on trial, which was the validity of the ordinance and proceedings then under consideration, and that the court will not be presumed to have attempted in that case to pass upon the validity of new ordinances and new proceedings, in the absence of anything to indicate that intention in the judgment, and hence the judgment in the former proceeding was not binding in the latter case.—Supreme Court of Kansas.

PUBLIC PROPERTY—ASSESSMENT LIEN

City of Indianapolis et al. vs. **City Bond Co.**—The purchase by a city of property, subject at the time of purchase to a lien for public improvements, does not destroy the liability of the property to the payment of an assessment, and brings it within the rule that public property cannot be sold for assessments for public improvements.—Appellate Court of Indiana.

RECOVERY OF STOLEN FUNDS

City of Newburyport vs. **Fidelity Mutual Life Insurance Co.**—Where the treasurer of a city paid life insurance premiums with checks bearing the name of the city and signed by himself as treasurer, the insurance company was charged with notice that it was receiving for his individual debt funds of the city, and the city was entitled to recover the amount of the checks from the insurance company. The negligence of the auditing officers of the city in not sooner discovering that the treasurer had made use of the city's funds in payment of the premiums was not available as a defense in an action by the city to recover the funds so misappropriated. It having been the duty of the insurance company to return the funds without a demand by plaintiff, it was liable for interest from the time the money was received.—Supreme Judicial Court of Massachusetts.

ORDINANCES—MISDEMEANORS

Smothers vs. **City of Jackson.**—An ordinance provided that all offenses made misdemeanors under the State laws shall constitute offenses against the municipality when committed within its limits incorporates into the ordinances of the municipality all State laws relative to misdemeanors. It is also prospective, and includes, not only the offenses so defined when adopted, but all offenses subsequently so defined. On a trial for unlawfully retailing intoxicating liquor, defendant's reputation not having been placed in issue by herself, it was error to admit evidence by the State, that defendant had the reputation of being a blind tiger keeper.—Supreme Court of Mississippi.

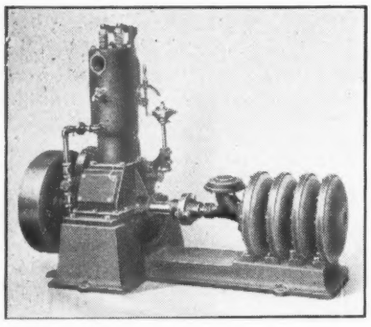
POWER OF APPOINTMENT—TIME

Smith vs. **Bogaskie.**—Johnstown City Charter, providing that appointments made by the Common Council and Board of Water Commissioners acting jointly shall be made at a joint session "to be held on the first day of January in the official year for which appointments are to be made, or, in case such day falls on Sunday, on the next day thereafter," does not limit the power of appointment to the time fixed, and the power to appoint, which is the paramount object of the provision, may be exercised at a subsequent time.—New York Supreme Court.

MUNICIPAL APPLIANCES

Centrifugal Pumps

A variety of centrifugal pumps, operated by gasoline or steam engines, are made by the Erie Pump and Engine Company, Erie, Pa. The accompanying illustration shows a turbine pump driven by a gasoline engine, both on the same base. It is suitable for pumping water to the tanks of high buildings for fire protection and other purposes, the small floor area occupied making it suitable for locations where space is valuable. This pump has only a one-and-one-half-inch discharge and is driven by a six-horsepower gasoline engine of the Erie make. At a recent test an inch and a half hose was attached to the discharge of the pump and with the engine running at full speed a stream of water was thrown from a one-half inch nozzle to a height of fifty feet, showing sufficient pressure for all ordinary house and fire purposes. With the discharge valve closed, the pump maintained a steady pressure of 35 1-2 pounds, which is equivalent to 82 feet of vertical elevation. The action of this one pump only shows a very small part of the possibilities embodied in this design. There is no limit to the pressure which can be secured by increasing the number of stages, and the quantity of discharge is governed entirely by the size of the water passages.



ERIE CENTRIFUGAL PUMP

This, however, is only one of the pumps made by this company. Class L vertical submerged pumps, made of iron or brass, vary in capacity from 62 to 74 gallons per minute for the 1 1-8-inch pump to from 62 to 74 gallons per minute for the 1 1-8-inch pump to from 8,830 to 10,590 gallons for the 4-inch size. Horizontal pumps having suction flange tapped for pipe varying from 2 1-2 to 20 inches have the same capacities. The latter class may be direct-connected to vertical steam engines. Sand and dredge pumps are made to raise from 30 to 300 cubic yards of material per hour. They also may be direct-connected. Class M belted pumps are made for use in permanent installations such as filter plants; they vary in capacity from 264 to 9,518 gallons per minute. Class H turbine pumps are put on the market to compete with standard volute pumps. They are manufactured in two or more stages. By adding successive stages any pressure or head may be secured.

Acme Oil Filter

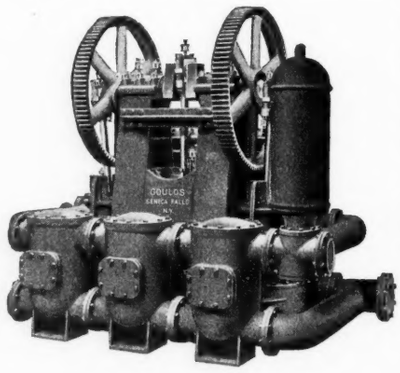
The cost of oil, while one of the minor expenses of operating a power plant, amounts to a considerable sum in a year's business. By filtering the oil after it has been used, a very appreciable economy can be effected. Bone black is the material that has been used for many years in refining the high grades of oil. This is the material through which oil must pass in the Acme Oil Filter, so there can be no question of the quality of the product. These filters are made in capacity varying from 2 to 235 gallons every twenty-four hours.

Underground Waste Receiver

C. H. Stephenson, 27 Farrar street, Lynn, Mass., manufactures a garbage receptacle which is buried in the ground and made accessible by means of a proper cap and cover. By the use of this device the present unsightly and injurious effects of wooden boxes now so generally used may be avoided, together with the attending annoyances of rats, cats and dogs. There is no chance of spilling garbage between the receptacle and the receiver as a shute delivers directly into the barrel.

Pumps for Fire Protection

Owners of property in congested districts who install a good system for fire protection perform a public service. They not only protect themselves, thereby securing decreased insurance rates, but help the adjoining property by lessening the exposure hazard. Good protection requires high pressure in supply. If high pressure is not furnished by the water works system, it must be produced by individual fire pumps in the building before the water can be effectively applied for extinguishing purposes. The policy of underwriters and municipalities is unmistakably tending towards the reduction of fire hazards by adopting these improvements in protection of buildings. The large fire losses that now occur are being recognized as an intolerable drain on the resources of the public and must be reduced by all reasonable means. An instance may be mentioned of the high pressure plant at Coney Island, N. Y., which it was found necessary to install owing to frequent fires and poor protection given by the Fire Department, with only limited facilities at their command. This section of the city is now protected by a high pressure system consisting of three Goulds Triplex Power Pumps, which can be started in two minutes and a half after the alarm has been received and give eighteen standard fire streams of 250 gallons each per minute at a pressure of 140 pounds per square inch at the hydrants. This installation received its first real test during the past year, when Coney Island was visited by a big fire among sham houses, papier maché and other combustible material, which was effectively checked in ninety minutes. Without the aid of this system Coney Island would have been entirely wiped out. Still another installation of this style was put to test at the Jamestown Exposition on June 26 last year. To guard against the consequences of fire during the fair a standpipe system was installed with Goulds Power Pumps to supply the necessary water under heavy pressure. Early in the morning an alarm of fire was turned in, and it quickly destroyed fifty-three wooden buildings, but owing to the high pressure system used the spread of the flames was entirely checked before it reached the Exposition grounds proper.



GOULDS TRIPLEX POWER PUMP

"Steel King" Dump Wagon

A bottom dumping wagon, made wholly of steel and iron, is the "Steel King," manufactured by the Symons Dump Wagon Works, 305 Old Colony Building, Chicago, Ill., with works at Sheridan, Ind. Although made of metal, it is no heavier than the best wooden wagons on the market. When open the doors reach but little below the rear axle, almost 18 inches from the ground. This is accomplished by the use of four doors, each pair swinging outward. For this reason the top of the wagon is not so high as to be inconvenient for men shoveling into it. The doors lock when drawn to place by a self-locking toggle-foot strap. There are no springs used in connection with the locking device nor with the self-releasing hand-lever. The wagon box is wide and short, setting within the wheels, the latter having a short base. They are made in five sizes, 1 1-2, 2, 2 1-4, 2 1-2 and 3 yards capacity each. The gauge is either 4 feet 8 inches or 5 feet 2 inches and tires 3 or 4-inch. The weight of the wagon complete varies, according to size, from 1,800 to 2,275 pounds.

THE MUNICIPAL INDEX

In Which Are Listed and Classified by Subjects All Articles Treating of Municipal Topics Which Have Appeared During the Past Month in the Leading Periodicals

ROADS AND PAVEMENTS

Road Construction, Some Points in. Paper Before Municipal and Allied Foremen's Institute. By E. B. B. Newton. 2 pp., The Surveyor, March 20.

Highway Maintenance and Repair. Description of the Gladwell system of tarred macadam. 1-3 p., Local Government Journal, March 21; 1-3 p., March 28.

Dustless Roadways. Abstract of Kansas City Park Board. Illustrated. By Roy R. Moore. 2 1-2 pp., The World To-day, April.

Dustless and Watertight Roads. Description of tarred macadam tried in Harrowgate, England. 1-3 p., Contractor, March 25.

Oiling Roads in Kansas City. Cost and methods. Abstract from 1907 Report. 1-2 p., Municipal Journal and Engineer, April 1.

Road Treatment with Tar and Oil in Rhode Island. Methods and cost. Paper before American Association for Advancement of Science. By Prof. A. W. Blanchard. 2 1-2 pp., Engineering-Contracting, March 25.

Tar Spraying in Bristol, England. Summary of results during past year. 1-3 p., Engineering Record, April 25. 1-2 p., The Surveyor, March 27.

Tar as a Preservative and Dust Layer. Specifications for applying tar on Connecticut State highways. 1-2 p., American Gas Light Journal, April 13.

Asphalt Paving Mixtures, Inspection and Control of. Technical article by L. Kirschbraun. 5 pp., Michigan Technic, February.

Costs of Laying Asphalt Pavement in Southern California. 1 1-2 pp., Engineering-Contracting, April 1.

Binder Course in Asphalt Paving. Abstract of paper before Illinois Society of Engineers and Surveyors. By J. G. Gabelman. 3-4 p., Engineering-Contracting, April 1.

Bitumen in Turkey. Crown concessions to be awarded. Extent of deposits. 2 1-2 pp., Consular and Trade Report, April 10.

Brick Pavement Construction. Reprint from Municipal Journal and Engineer of article by Will P. Blair and of paving data. Illus. 2 pp., The Clay Worker, March.

Foundations for Brick Pavements. Comparative strength of brick and concrete. Results of tests by Prof. I. O. Baker. 2 pp., Municipal Engineering, April.

Brick Pavements and Cement Curbs, Cost of Constructing. Itemized cost of labor and materials at Centerville, Ia. By M. G. Hall. 1 2-3 pp., Engineering News, April 2.

Materials and Means of Paving Streets in London. Fifth annual report of Metropolitan Committee, giving résumé of year's work. 1 1-2 pp., Contract Journal, April 15.

Paving in Cambridge. Comparison of various kinds of pavement. By L. M. Hastings. 3-4 p., Municipal Journal and Engineer, April 1.

Cost of Paving Laid in 1907. Unit costs in a number of cities, with wages and costs of materials. Tables. 3 1-4 pp., Engineering-Contracting, April 1.

Repairing Asphalt, Brick and Stone Pavements in Erie, Pa. Details of cost during three years. 3 1-2 pp., Municipal Engineering, April.

Asphalt Repair Plant. Cost of operating the Brooklyn plant and of laying pavement. 3-4 p., Engineering Record, April 11.

Road Congress, International. Program of congress to be held in Paris next October. 2 pp., Technique Sanitaire, April 1.

Automobile Driving, Punishment for Reckless. French law. 1-2 p., Consular and Trade Report, April 10.

Sidewalk Specifications, Quincy, Ill. Specifications for cement sidewalks, including those over vaults. 3-4 p., Municipal Journal and Engineer, April 1.

SEWERAGE AND SANITATION

Sewerage and Sewage Disposal. Series of articles on design, construction and maintenance of sewers and sewage disposal. By H. C. H. Shenton. 2-3 p., Local Government Journal, April 4, 11, 18.

Grade in Conduits, Greatest Permissible. By Th. Heyde. 1 p., Gesundheits Ingenieur, April 11.

Ventilation, Sewer, and the Intercepting Trap. Discussion before Royal Sanitary Institute. 6 pp., The Surveyor, March 20.

Pipe, Cast Iron, and Reinforced Concrete, Tests of. Abstract of paper before Western Society of Engineers. By Prof. A. N. Talbot. Illustrated. 2 3-4 pp., Engineering-Contracting, April 22.

Cement Drain Tiles, Tests of. Result of tests by Iowa State College students. Abstract of paper before Iowa Cement Users' Association. By Prof. A. Marston, 1 3-4 pp., Engineering-Contracting, March 25.

Construction of Reinforced Concrete Sewer. Double-barreled eight-foot sewers in the Bronx, N. Y. Technical description. Illustrated. 2 1-4 pp., Engineering Record, April 4.

Sewerage System, Boston Metropolitan District. Construction methods used. By Howard S. Knowlton. 2 1-4 pp., Engineering Record, April 4.

Reinforced Concrete Sewer at Waterbury, Conn. A 4 foot 6 inch outfall sewer. Plans and construction technically described. Concrete pressure main. By William G. Taylor. Illustrated. 3 3-4 pp., Engineering News, March 26. 1 1-2 pp., Engineering Record, April 4.

Excavating Sewer Trenches with Steam Shovels. Methods and cost of. Illustrated. 1 1-2 pp., Steam Shovel News, April.

Tunnel, Sewer, in Canal Street, New York City. Technical description of methods of construction. Illustrated. 2 1-2 pp., Engineering Record, April 18.

Sewer Tunnel in Rock Excavation in New York. Technical description of construction methods. 2 2-3 pp., Engineering Record, April 11.

Calumet Sag Canal, Chicago. Suit by United States to prevent. 2 1-2 pp., Real Estate News, April.

Cleaning Catch Basins in Boston. Loose methods criticised by Finance Commission. 3-4 p., Municipal Journal and Engineer, April 22.

Sewage Disposal in Pittsfield. Latest reports from sewage pumping plant. Illustrated. 1 1-4 pp., Municipal Journal and Engineer, April 8.

Worcester (Eng.) Sewage Purification Works. Detritus well, disintegrating tanks and bacterial filters. 3-4 p., Contract Journal, April 1.

Sewage Disposal at Manchester, England. Notes concerning. 1-4 p., Engineering Record, April 4.

Septic Tank Patent, To Fight. Note concerning organization for this purpose. 1-4 p., Municipal Journal and Engineer, April 1.

Suspended Matters, Removal of, from Water and Sewage. Technical discussion. 1 1-2 pp., Engineering News, March 26.

Sewage and Water Purification. State supervision in Ohio and elsewhere. 1 1-2 pp., Engineering Record, April 11. 2 pp., Engineering News, April 9.

Stream Pollution, New York Laws Relating to. By A. H. Seymour. 2 1-2 pp., Municipal Engineering, April.

River Pollution. Discussion before Royal Sanitary Institute. 3 1-2 pp., The Surveyor, April 10.

Pollution of the Delaware River. Abstract of report of New York City Department of Health. 1-4 p., Engineering News, April 23.

Sewage Purification and Stream Pollution Law. New Ohio State law. 1-2 p., Engineering News, April 9.

Contamination of Lake Michigan, Movement to Suppress. 2-3 p., Engineering Record, April 18.

Pumping Station and Flushing Tunnel, Kinnickinnic River. General description. Illustrated. 1 2-3 pp., The Engineer, April 1.

Screw Pump of Kinnickinnic River Flushing Station. Official test. 3-4 p., Engineering News, April 23.

Public Health Water Supply and Sewerage Investigation, Proposed National. Text of bill. 3-4 p., Engineering News, April 2.

Sanitary Campaign in California. Work done by U. S. Public Health Service. 2 pp., Engineering Record, April 11.

Engineering and Architecture and Public Health. Part played in promotion of sanitary conditions. Paper before Douglass Health Congress. By Wm. Goldstraw. 13 pp., Journal of Royal Institute of Public Health, April.

Universal Hygiene, Proposition of. 2 pp., Revista Municipal, April 1.

Rats, Trapping. United States official instructions. 1-2 p., Engineering News, April 9.

Infant Mortality in American Cities. Reports from New York, Philadelphia, St. Louis, Baltimore, Buffalo, Cincinnati, Milwaukee, Minneapolis, Providence and Rochester. Compiled by Geo. B. Mangold. 10 pp., Annals American Academy Political and Social Science, March.

Milk Supply, Mexico City's. Quantity, inspection, etc. 1 p., Consular and Trade Report, March 30.

Birmingham Milk and Preservatives. Review covering ten years. By J. F. Liverseege. 6 pp., Journal Royal Institute of Public Health, April.

Oyster Dealers, Licensing. New York City Health Code. 1-4 p., Municipal Journal and Engineer, April 15.

State Sanitation in Ohio. Editorial comment on recent progress. 2-3 p., Engineering News, April 9.

Sanitary Investigation of Mohawk River Drainage Area. Work done by New York State Health Department. 1-3 p., Engineering News, April 2.

Montclair, N. J., Board of Health. Excellent work done. Compulsory tuberculin testing. 1 1-4 pp., Municipal Journal and Engineer, April 8.

Cuba, Health of, in 1907. Synopsis of Government report. 1 1-2 pp., Revista Municipal, April 15.

Hamburg, Sanitation at. Abstract of reports to Congress of Hygiene and Demography. 2 1-2 pp., Revista Municipal, April 1.

Australia, Public Health Administration in. By Ernest Black. 5 pp., Journal Royal Institute of Public Health, April.

WATER SUPPLY

Water Supply of Syracuse. 1-2 p., Municipal Journal and Engineer, April 22.

Ithaca, N. Y., Water Works and Fire Department. Editorial correspondence. 3-4 p., Municipal Journal and Engineer, April 15.

Municipal Water Supplies. Brief descriptions of supplies at Amsterdam, Berlin, Copenhagen, Stockholm, Upsala and Madrid. 14 pp., Annals American Academy of Political and Social Science, March.

Ground Water Development at Pueblo, Colo. Utilization of underground flow of Fountain river; concrete pipe line. Illustrated. 4 pp., Engineering Record, April 4.

Reservoir, Concrete, Method and Cost of Constructing. Details of small reservoir at Pomona, Cal. 3-4 p., Engineering-Contracting, April 15.

Constructing Cobb's Hill Reservoir, Rochester. From 1906 report. Illustrated. 3 1-4 pp. Municipal Engineering, April.

Croton Falls Reservoir. Construction methods described. Illustrated. 3 pp., Engineering Record, April 11.

Reinforced Concrete Reservoirs and Aqueduct of Mexico City. Technical description. By James D. Schuyler. Illustrated. 3 1-4 pp., Engineering Record, March 28.

Water-Proofing Reservoirs. Modern methods employed at Findlay, O.; Pittsburg, Pa.; Muskogee, Okla. Illustrated. 2 pp., Water-Proofing and Fire-Proofing, April.

Dam, Earth, with Reinforced Concrete Core-wall. Description of one at Dixville, N. H. Illustrated. By Arthur W. Dudley. 3-4 p., Engineering Record, April 25.

Main Dam of Croton Falls Reservoir. Construction of. Technical description. 3 3-4 pp., Engineering Record, March 28.

Hollow Concrete Steel Dams, A Few Words About. By Chas. H. Eglee. Illustrated. With discussion. 16 pp., Journal New England Water Works Association, March.

Respiration of an Inland Lake. Describing seasonal changes in contained oxygen, carbon, etc. Address before American Fisheries Society. By Prof. E. A. Birge. 15 pp., Popular Science Monthly, April.

Water Tower, Reinforced Concrete, at Anaheim, Cal. A 30 x 32-foot tank on a 60-foot tower. Illustrated. 1-2 p., Engineering Record, April 11.

Reinforced Concrete in American Water Works and Sewerage Construction. Paper before Royal Society of Arts. By Ernest R. Matthews. Illustrated. 2 pp., The Surveyor, March 27. 1 p., Contract Journal, March 18.

Casting Iron Pipes in Permanent Molds. Paper before Franklin Institute. By Edgar A. Custer. Illustrated. 7 pp., Iron Age, April 16. Journal of Franklin Institute, March.

Water Mains Under Sidewalks. Laying 20-inch mains in Utica. 2-3 p., Engineering Record, April 7.

Laying Submerged 12-inch Water Main. Method and cost. Abstract from paper before Canadian Society of Civil Engineers. By J. Causley. Illustrated. 2 2-3 pp., Engineering-Contracting, April 22.

Aqueduct, Catskill, New York Water Supply. Sub-surface investigations. Wash boring and other methods. Paper before Municipal Engineers of city of New York. By Robt. Ridgway. Illustrated. 2 3-4 pp., Engineering Record, April 18; 2 3-4 pp., April 25.

New York Water Supply, Catskill Aqueduct. Soundings for a crossing of the Hudson river. Geological and other conditions discovered. Methods of making borings, etc. Illustrated. 3 1-4 pp., Engineering News, April 2.

Tunnel of Detroit Water Works. Method of building described. Abstract of paper in Journal of Association of Engineering Societies. By James Ritchie. 1 p., Engineering-Contracting, April 1.

Iron Pipe, Locating Buried. Special dip needle for this purpose. 1-4 p., Municipal Journal and Engineer, April 22.

Action of Water on Pipes. Result of recent chemical researches. By Freeland Howe, Jr. With discussion. 16 pp., Journal New England Water Works Association, March.

Freezing, Protecting Water Pipes from. Discussion by Association. 1 1-4 pp., Journal New England Water Works Association, March.

Composition of Natural Waters, Variability in. Illustrated. 1 p., Water, March 16.

London Water Supply, Chemical and Bacterial Examinations of. 1-2 p., Engineering News, April 16.

Filtration, Novel Methods and Theories. Discussion of experiments and advances made in practice in Europe and America. By Adolph Kemna. 2 1-2 pp., Engineering News, March 26.

Continuous Filtration of Bath Water. Extract from paper before Association of Municipal and County Engineers. By Robt. J. Angel. 1-2 p., Local Government Journal, March 21.

Filtration and Filters at Lawrence, Mass. History and popular description. Illustrated. 4 pp., Municipal Engineering, April.

Lawrence Filter, Collapse of Roof of. Paper before New England Water Works Association. By Sanford E. Thompson. Illustrated. 6 pp., Cement Age, April.

Electricity, Purification of Water by. Method proposed by Leon Dion. By E. L. Elliott. Illustrated. 5 pp., Popular Electricity, May.

Water Softening at Oberlin, O. From annual report of W. B. Gerrish. 2-3 p., Engineering Record, April 18.

Purifying Water of High Turbidity without Coagulants. Use of Blaisdell washing machine for cleaning sand filters. By Wm. B. Fuller. 1 p., Municipal Engineering, April.

Water Purification Plant, Toledo, O., Construction Methods. Technical description. Illustrated. 2 1-4 pp., Engineering Record, April 4.

Water and Sewage Purification Plants in Ohio. Report of general investigation by State Board. 2 pp., Engineering News, April 9. 1 1-2 pp., Engineering Record, April 11.

Public Water Supplies. Oversight by Indiana State Board of Health. 1-2 p., Bulletin of the Board, February.

Pumping Engines, High Duty vs. Low Duty. Paper before American Water Works Association. By Irving H. Reynolds. 5 1-2 pp., Water and Gas Review, March.

Producer Gas Plant. Experience with a pumping plant at Hingham, Mass. By Harry L. Thomas. Illustrated. With discussions. 21 pp., Journal New England Water Works Association, March.

Meters and Meter Tests at Los Angeles. Illustrated. 1 p., Fire and Water, April 8.

Meters and Water Consumption. Abstract from paper before Connecticut Society of Engineers. By Ermon N. Peck. 1 p., Water and Gas Review, April.

Water Connections. Charges in the larger cities for automatic sprinkler equipments. Illustrated. 4 1-2 pp., Insurance Engineering, April.

Finances of Water and Light Plant, Greenwood, S. C. Report for 1907. 1 p., Municipal Journal and Engineer, April 22.

Automobile for Water Works Superintendents. One year's practical everyday experience. By F. F. Forbes. 4 1-2 pp., Journal New England Water Works Association, March.

STREET LIGHTING AND ELECTRIC POWER

Municipal Lighting in California. 1 p., Municipal Journal and Engineer, April 22.

Lighting at Holyoke. Municipal gas and electric plants in 1907. 3-4 p., Municipal Journal and Engineer, April 8.

Lighting Plant, Taunton's Municipal. Physical and financial report for 1907. 1-2 p., Municipal Journal and Engineer, April 8.

Municipal Electric Plant of Wolverhampton, England. Illustrated. 1 p., Municipal Journal, March 20.

Lighting and Pumping Plant at Cassville, Wis. General description of small municipal plant. Illustrated. 1 1-2 pp., The Engineer, April 1.

Lighting Companies of New York State, Classification of Accounts for. Proposed by Public Service Commission. 3-4 p., Street Railway Journal, April 18.

Street Lighting in the United States During 1907. Brief summary of methods employed. By H. Thurston Owens. 3 1-2 pp., Illuminating Engineer, March.

Street Lighting Effects, Comparison of. Polar distribution, candle feet, photometers, etc., discussed. By W. H. G. Webber. Illustrated. 2 pp., American Gas Light Journal, April 6.

Electrical Conduits, Municipal Advocacy of These for New York City. By Harry P. Nichols. 3-4 p., Municipal Journal and Engineer, April 15.

Electric Conduits. Description of Chicago's conduit tunnels and their construction. By Geo. B. Springer. Illustrated. 10 pp., Cement World, April.

Electrical Conduits, Cost of Building in Baltimore. Costs and details during eight years, with details of construction. Illustrated. 5 1-2 pp., Engineering-Contracting, April 1.

Pole Lines, Joint. Operation in Chicago of joint use of poles by two companies. 3-4 p., Municipal Journal and Engineer, April 22.

Joint Occupancy of Poles. Report of

committee of Western Association of Electrical Inspectors. 3 pp., American Municipalities, April.

Concrete Poles for Electric Wires. General statement. Illustrated. 1 1-2 pp,. Cement World, April.

Tungsten Filament Lamps. Editorial. 3-4 p., Electrical Review, April 18.

Gas Standard, Dallas. Discussion of ordinance. By Alton D. Adams. 1 1-4 pp., Municipal Journal and Engineer, April 1.

Illuminating and Power Gas Produced from Waste Products. Description of the Harris process. Illustrated. 2-3 p., Electrical Review, March 28.

Hygienics of Gas and Electricity. Paper before Royal Sanitary Institute. By Samuel Rideal. 2 pp., Progressive Age, April 1.

Meter Testing Department of Hartford Electric Light Company. Full description of appliances and methods. By Supt. F. W. Prince. Illustrated. 8 pp., Electric Journal, April.

FIRE AND POLICE

Fire Department, Bridgeport. Description of apparatus and personnel. Illustrated. 2 pp., Fire and Water, March 25.

Fire Engine and Hose Wagon, Automobile. The Webb apparatus of St. Louis. By Chas. Claude Casey. 1 p., Municipal Journal and Engineer, April 1.

Fire Boats for Chicago. Description of two boats now under construction. Illustrated. 2 pp., Fire and Water, April 1.

Fire Protection for Small Towns and Villages. By J. F. C. Menlove. 1 3-4 pp., Western Municipal News, April.

Prevention of Fire Losses. Immensity of losses in this country. By A. M. Lewis. 1 3-4 pp., American Industries, April 1.

Chelsea Conflagration. Story of the fire by a fireman. Illustrated. 5 pp., Fireman's Herald, April 25.

Building Laws, Rigorous, for Chelsea, Mass. Editorial. 1-2 p., Iron Age, April 23.

Fireproof Building. Popular plea. By F. W. Fitzpatrick. Illustrated. 10 pp., The Outlook, April 25.

Police, School of Instruction for. Work done by New York Department. 1-2 p., Municipal Journal and Engineer, April 8.

GOVERNMENT AND FINANCE

Municipal Charters. General discussion. By Edwin Ray Zion. 1 1-2 pp., Pacific Municipalities, March.

Galveston Plan of City Government. Description by member of Galveston City Club. 2 pp., Cincinnati Citizen's Bulletin, April 18.

Municipal Ownership at Port Arthur. Description of general municipal ownership of public utilities in a Canadian City. 1 p., Municipal Journal and Engineer, April 1.

Commissions, Public Service. Address before Illinois Gas Association opposing these. By Chas. H. Dickey. 1 1-4 pp., American Gas Light Journal, April 20. 1 p., Progressive Age, April 15.

Public Utilities Commissions and Franchise Valuations. Paper by Henry Floy before American Institute of Electrical Engineers. 3 3-4 pp., Electrical Review, April 18.

Wisconsin Rate Commission. Testimony and decision of commission on application for increasing rates on electricity. 4 1-4 pp., Midland Municipalities, April.

Public Works Commissions Should Be Composed of Engineers. Editorial. 1-2 p., Engineering-Contracting, March 25.

Engineers in Public Affairs. Public utility commissions and franchise valuations. By Henry Floy. 19 pp., Proceedings of American Institute of Electrical Engineers, April.

Accounting, Municipal. Report of committee on uniform submitted to League of Iowa Municipalities. By F. C. Norton. With discussion. 6 pp., Midland Municipalities, April.

Municipal Accounts, State Supervisors of. Description of various State laws on the subject. By A. B. Nye. 5 pp., Pacific Municipalities, March.

Account Keeping, Municipal. Value of systematic accounting, with illustrations. Paper before Massachusetts Highway Association. By Harrison P. Eddy. 2 1-2 pp., Municipal Journal and Engineer, April 1.

Bond Values, Another Fallacy in. Advocating semi-annual interest as a standard. By Arthur S. Little. 12 pp., Journal of Accountancy, March.

Municipal Bond Sales During February. With financial statistics of the cities. 3-4 p., Municipal Journal and Engineer, April 1.

STREET CLEANING AND REFUSE DISPOSAL

Street Cleaning in Williamsport, Cost of. 1-4 p., Municipal Journal and Engineer, April 22.

Automobile Asphalt Cleaner. Description of German Machine. Illustrated. 1-2 p., Municipal Journal and Engineer, April 1.

Street Cleaning and Motor Traffic. Paper before Douglass Health Congress. By E. Shrapnell Smith. 3 1-2 pp., Journal Royal Institute of Public Health, April.

Street Cleaning and City Wastes Disposal. General discussion. By Paul Hansen, Ass't Engineer Ohio State Board of Health. 3 pp., The Surveyor, March 27. 1 p., Engineering News, April 23.

Street Cleaning and Waste Disposal. Abstract of report to Mayor McClellan of New York, by Parsons, Hering & Whinery. 2 3-4 pp., Engineering News, April 23.

Refuse Experiment Station. State Experiment Station Asked for in Pennsylvania. 1-3 p., Municipal Journal and Engineer, April 22.

Garbage Dumping Unsanitary. From Augusta, Ga., Health Board Report. 1-4 p., Municipal Journal and Engineer, April 22.

Rubbish Incineration in New York. History and description of Williamsburg Bridge plant. Illustrated. Abstract of paper before Am. Soc. C. E. By F. L. Stearns. 2 3-4 pp., Municipal Journal and Engineer, April 15.

Destructor, Refuse, at Prahran, Australia. Brief description. Illustrated. 1 p., Municipal Journal and Engineer, April 1.

Carcass Destruction in Berlin and Elsewhere. By P. Naumann. Description of methods and apparatus. Illustrated. 5 1-2 pp., Gesundheits Ingenieur, April 11.

PARKS AND OUTDOOR ART

Town Planning and Housing Bill. Text of bill before English Parliament. 3-4 p. Local Government Journal, April 4. 2 pp., Municipal Journal, April 3.

Town Planning and Housing. Editorial discussion. Contract Journal, April 1.

Town Planning at Point Grey, B. C. A new departure in laying out a town site. By Frederick G. Todd. Illustrated. 2 1-2 pp., Canadian Municipal Journal, April.

Playgrounds in Washington and Elsewhere. By Jacob A. Riis. 3 pp., Charities, April 18.

Park Gardens. Bedding plans of Washington and Lincoln Parks, Chicago. With diagrams and photographs. 1 p., Gardening, April 15.

Philadelphia's Parkways. Plans and brief description. "Architecture in Philadelphia." By Hugh Elliott. Illustrated. 14 pp., Architectural Record, April.

Helena a Clean City, Making. By Jacob A. Riis. 2 1-2 pp., Charities, March 28.

TRAFFIC AND TRANSPORTATION

Motor Traffic As It Affects Municipalities. Paper before students of Institution of Engineers. By A. E. Jackson. 2 1-2 pp., The Surveyor, April 10.

Street Crossings, Dangerous, in London. 1-4 p., Literary Digest, February 18.

Tramways, Liverpool Corporation. Seventh annual report. 1 p., Contract Journal, April 15.

London County Council's Tramways. Auditor's report. 1-3 p., Electrical Review, April 11.

Tracks, Electric Railway. Construction and Maintenance of. By H. L. Weber. Illustrated. 3 pp., Street Railway Journal, April 4.

Prepayment Cars in Cincinnati and Cleveland. Description of two designs. Illustrated. 2 pp., Electric Railway Review, April 4.

Tunnels, Hudson. Popular description. By Louie E. Van Norman. Illustrated. 8 pp., Review of Reviews, April.

East River Tubes Connecting New York and Brooklyn. Semi-popular description of plans and construction. Illustrated. 8 pp., Electrical Review, April 11.

Underground Bridge Terminal in New York. Terminal and loops for Brooklyn surface and elevated lines. Illustrated. 4 pp., Street Railway Journal, April 11.

Bridge Loop Subway for Brooklyn Surface and "L" Cars. Illustrated. 2 1-2 pp., Engineering Record, April 4.

Market Street Subway, Philadelphia, The Construction of. Detailed account. Illustrated. 2 2-3 pp., Engineering Record, April 25.

MISCELLANEOUS

Description of Cities. North Carolina Cities. Editorial correspondence from Winston-Salem, Wilmington, Greensboro and Charlotte. Illustrated. 1 1-2 pp., Municipal Journal and Engineer, April 1.

South Carolina Cities. Charleston, Greenville and Spartanburg. Editorial correspondence. Illustrated. 2 pp., Municipal Journal and Engineer, April 22.

Georgia's Cities. Editorial correspondence from Savannah, Atlanta, Macon, and Augusta. Illustrated. 4 pp., Municipal Journal and Engineer, April 15.

Springfield, Mass. Editorial correspondence from. Illustrated. 2 pp., Municipal Journal and Engineer, April 8.

Waterbury, Conn. Editorial correspondence. 3-4 p., Municipal Journal and Engineer, April 8.

Cities of Mexico. Municipal Improvements and Public Works. 3-4 p., The Tradesman, April 1.

Municipal Improvements in Mexico. Notes of several cities. By W. D. Hornaday. 1 1-4 pp., Municipal Engineering, April.

Buenos Aires. "The City of Good Airs" Impressions of a visitor. By Arthur Huhl. Illustrated. 20 pp., Scribner's, May.

Municipal Progress in Spain. 1 1-2 pp., Revista Municipal, April 15.

Statistics, Chicago. Street Cleaning, garbage disposal, light plants, etc., in 1907. 1-2 p., Municipal Journal and Engineer, April 8.

Municipal Ferries in six cities. Physical and financial data. 1-3 p., Municipal Journal and Engineer, April 15.

Market, Rochester's Public. History and description, finances, etc. Also brief statement concerning other municipal markets. Illustrated. 4 1-2 pp., Municipal Journal and Engineer, April 1.

Swimming Baths, Open Air. Dimensions, cost, etc., of nine English baths, tabulated. 1 p., The Surveyor, March 27.

Congestion of Population. Exhibit showing New York conditions. Description of what it revealed. By John Martin. 13 1-2 pp., Charities, April 4.

Congested Districts. Where the workers in them live. By Henry R. Seager. 3 1-2 pp., Charities, April 4.

Playing in Congested Districts. Where children play and how. By Jos. E. Lee. Illustrated. 5 pp., Charities, April 4.

Sweat Labor and Congestion. By Mrs. Florence Kelley. Illustrated. 2 1-2 pp., Charities, April 4.

Italians in Congested Districts. By Gino C. Speranzo. 2 1-2 pp., Charities, April 4.

City Population Increasing in Germany. "Vanishing German Villages," 1 p., Consular and Trade Reports, April 11.

Model Tenements and Suburban Homes. "The Way Out." By E. R. L. Gould. 1 1-4 pp., Charities, April 4.

Municipal Farm Colony. Grouping of penal, philanthropic and sanitary institutions of Cleveland on a 2,000-acre farm. By W. Frank McClure. Illustrated. 3 pp., The World Today, April.

Bridges and Culverts Constructed of Reinforced Concrete. Paper before Nebraska Cement Users' Ass'n. By James Mortland. 2 pp., Engineering-Contracting, April 1.

Concrete Bridge at Washington, D. C. Connecticut Avenue Bridge 1,341 feet long. Illustrated. 1. p., Engineering News, March 26.

Reinforced Concrete Highway Bridge at Hackensack. Illustrated. 1-2 p., Concrete, April.

Manhattan Bridge, New York. Methods of erecting towers. Illustrated. 3 pp., Engineering Record, April 4.

Manhattan Bridge, New York. Popular description. Illustrated. 1-2 p., Collier's, April 4.

Concrete Construction, Sand in, The Value of. Report to National Ass'n of Cement Users. By E. S. Larned. 3 1-2 pp., Cement Age, March.

Card Systems for Municipalities. Suggestions from experience. By W. C. Yale. 1 1-2 pp., Pacific Municipalities, March.

Maps of Underground Structures. Desirability of these. 1-3 p., Municipal Journal and Engineer, April 15.

Exhibit, Municipal and Public Health, Depicting progress in municipal work. 1-3 p., Contract Journal, April 15.

Laboratory, Rochester Testing, Connected with City Engineer's department. Illustrated. 3 1-2 pp. Municipal Engineering, April.

Pittsburg's Mayor. "A Mayor with an Ideal." What he has done. By Clinton Rogers Woodruff. Illustrated. 3 1-2 pp., The Outlook, April 25.

Telephone Situation in Canada. Monopoly and government ownership. By Francis Dagger. 2 3-4 pp., Telephony, April.

BOOK REVIEWS

The Colorado Springs Lighting Controversy. By Henry Floy. Illuminating Engineering Publishing Company, New York. Price $4.25.—The author of this was one of three arbitrators appointed to decide a controversy between the city of Colorado Springs, Col., and the Pike's Peak Hydro-Electric Company, which controversy was of more than local interest because it involved a determination by experts of three important questions. First: The meaning of the phrase, "An arc light of standard 2,000 candle power." Second: The monetary damage occurring by the substitution of a 6.6 ampere series alternating-current arc lamp for "an arc light of standard 2,000 candle power." Third: The financial damage resulting from the failure to maintain the substituted lamps at their normal operating conditions. Owing to the high standing of the arbitrators and also of the various electrical experts called as witnesses the decisions rendered and the methods of estimating concerning the second and third questions will probably be accepted as final. Because of the importance of the questions involved and of the fact that, being an arbitrated case, no record of the findings would appear in the law journals, it was undoubtedly fortunate that one so well qualified to compile the information made available by this case should have undertaken the task. To the non-technical reader the general synopsis of the controversy and award, which occupies 18 pages, will probably receive the most careful attention. In addition to this, however, and occupying the remaining 300 pages, will be found all of the exhibits introduced (some of which have bearing only on the local phases of the dispute, but the majority are of great technical interest), and the evidence of the various witnesses and arguments of the counsel for both sides. In conclusion, a very complete index of the matter has been added, which permits the studying at first hand of the evidence on each of the points in question. "All the experts agreed that the term '2,000 candle-power light' could relate only to a direct, constant current, series, open arc lamp taking not less than 9.6 amperes and consuming, approximately, 450 volts to the arc." The uncontradicted testimony of the expert witnesses was to the effect that 6.6 ampere enclosed arc lamps of the series, alternating system, which had been furnished by the company, when operated under normal conditions, did not come within the meaning of the phrase, "arc lights of standard 2,000 candle-power." One of the most difficult questions presented to the arbitrators was the amount of rebate for overcharge which the company should pay as the difference between the value contracted for and that furnished. The evidence indicated that a 7.5 ampere, alternating, series, enclosed arc lamp would be a fair equivalent for the 2,000 candle power lamp stipulated. The difference in candle power between this 7.5 ampere lamp and the 6.6 ampere one of the same type furnished by the company was about 20 per cent. The principles involved and the data employed in reaching this conclusion were fully set forth in this evidence. The company operated these lamps at times below normal and at times above, and another difficult determination was the decision as to what proportion of full value in light was being rendered under such conditions. This point also is well covered by the testimony. A number of subjects only indirectly bearing upon the dispute found interesting explanation in the evidence; among these being the methods employed in measuring candle power and illumination, details of construction and comparative values of open and enclosed arc lamps, direct and alternating current, etc. Altogether the book contains meat for all who are interested in electric lighting, whether from the business or from the purely technical point of view.

Specifications for Street Roadway Pavements. By S. Whinery. Published by Engineering News Publishing Company. Price, 50 cents.—The author has had wide experience in street paving and has contributed much to the literature on the subject. He offers this pamphlet more as a basis for the preparation of specifications for proposed work and as giving suggestions concerning paving methods, than as forms to be used verbatim by engineers generally; although such use could undoubtedly be made of them. Numerous footnotes are introduced explaining or amplifying certain clauses or recommending alternatives. The author argues against the practice of some engineers of not only prescribing the material and methods to be employed, but also the results to be obtained, claiming that this is illogical, often unreasonable and liable to lead to complications between the engineer and the contractor. On the other hand, he states that no contractor can justly complain against this or that provision of a specification as being unusual, unnecessary or unfair, providing it is clearly and definitely stated in the specificaton, so that he may have understood exactly its meaning and framed his prices accordingly. These specifications cover grading, pavement foundations, asphalt, rock asphalt, block asphalt, bituminous concrete, granite block, brick and wood block pavements. No attempt is made to give specifications for proprietary or patented pavements. They do, however, contain general specifications for experimental or untried pavements, consisting chiefly of specific guaranty and bond clauses.

International Association of Municipal Electricians. Proceedings of the Twelfth Annual Convention.—At this convention, which was held last July, there were read many papers of interest, not only to municipal electricians, but also to all who are interested in electric lighting and lighting plants. Among the papers of special interest to such are the following: "The Operation of a Municipal Lighting Plant in Connecticut," by A. L. Pierce of Wallingford; "Luminometer Method of Inspecting Street Arc Lamps," by C. S. Downs of Altoona, Pa.; "Municipal Electrical Inspection and Records," by R. A. Smith, Superintendent of Electrical Affairs of Norfolk, Va. All of these papers were discussed quite thoroughly, and additional ones, dealing with more technical matters, were read. There were also letters and discussions on municipal conduits, regulation of street railways by cities, etc. About seventy-five or eighty pages are taken up with these papers and discussions. The secretary of the society is Frank P. Foster, Corning, N. Y.

NEWS OF THE SOCIETIES

American Water Works Association.—At the 28th annual convention to be held at Washington, D. C., May 11 to 16, the following technical papers will be presented:

Tuesday, May 12, 9 a. m. Report of Publication Committee on Fire Protection, Water Supply Investigation, Water Works Standards; Report on Standard Specifications for Cast Iron Pipe.

Afternoon Session, 3.30 o'clock. Report of the Committee on Uniform Annual Reports. Paper by L. J. Powers, Chief Statistician of the Bureau of the Census, on "Water Works Financial Schedule." This paper will be discussed in connection with the report of the committee. Other papers: By Nicholas S. Hill, Jr., on "Probable Errors Due to the Apparatus and Gauges Used in the Commercial Tests of Meters"; R. J. Thomas, on the "Practical Workings of Detector Meters."

Evening Session, 8 o'clock. "Pumping Water by Producer Gas Plant," by F. A. Barbour; "High Duty Versus Low Duty Pumping Machinery from the Operator's Standpoint," by J. N. Chester; "Copenhagen Water Works," by W. P. Mason; "The Necessity of Laying Water Mains with the View of Future Cleaning," by George F. Whitney.

May 13, 9 o'clock. "Incrustation Experience at Quincy, Ill.," by W. R. Gelston; "Character and Composition of the Incrustation from Discharge Pipe at Quincy, Ill.," by Edward Bartow.

Thursday, May 14, 9 o'clock. "Water Rates in 315 Cities," by Dow R. Gwinn; "Suction as Applied to Pumps," by William Perry; "The Premier Meter as a Precise Apparatus for Measuring the Flow of Water in Large Mains," by Arthur S. Tuttle.

Afternoon session, 1.30 o'clock. "Geologic Basis for Artesian Prediction," by N. H. Darton; "Artesian Waters of the Atlantic Costal Plain," by Myron H. Fuller; "Stripping Reservoir Lands," by J. M. Diven; "The Significance of Nitrogen in Its Various Forms in Water Supply," by Frank E. Hale; "The Relation of Engineering Design to Foundry Manufacture of Cast Iron Forms," by W. R. Conard.

Evening session, 8 o'clock. "The Efficiency of the American Process of Filtration," by James M. Caird; "An Instance of Lake Purification," by W. P. Mason; "The American Desert and Its New Water Works," by Arthur P. Davis.

Friday, May 15, 9 o'clock. "Action of Water on Galvanized Iron," by Wilson F. Monfort; "The Selling of Surplus Water by Municipalities to Private Water Companies or to Individual Consumers Outside of City Limits," by George H. Felix; "Ownership of Public Utilities," by C. W. Wiles; "The Troubles of the Private Water Company," by J. T. Sawyer; "Competitive Water Works," by Charles R. Henderson.

Evening session, 8 o'clock. "History of Pumping Engines," by Charles A. Hague; "Water Problems of Mexico," by Edward Bartow.

Saturday, May 16, 9.30 o'clock. "The Operation of a Sixteen-Inch Syphon at Richmond, Ind.," by Howard A. Dill; "Repairs to a Seventy-two-Inch Steel Main Under Thirty Feet of Water," by A. W. Cuddeback; "Washington Water Works, a Historical Account," by Francis F. Longley.

Afternoon session, 2 o'clock. "Some Experience in Locating Leaks and Repairing a Broken Main," by George H. Robertson; "A Water Works Swimming Pool," by Willis B. Durlin; "Battery Arrangement of Water Meters," by George E. Booker; "Some Experiences of a Superintendent of Water Works," by S. A. Gailey; "Collection of Water Rates," by Thomas Stone; "What Would Be a Proper Charge for a Service Under These Conditions," by Sidney C. Robinson.

Chemists' Club of New York.—Professor William J. Hallock of Columbia University told the members of the Chemists' Club, April 23, about a new discovery whereby it would be possible for a householder to purchase a bottle of illuminating gas on his way home without leaving $5 deposit. The illuminant may be bought by the pound at 15 cents or so, when somebody starts in to manufacture it. As yet its manufacture has not been undertaken in this country. It has been used in Germany, where it was discovered by Professor Blau. After him it is named Blaugas. Professor Hallock had a jar of it at the Chemists' Club and showed its power of illumination. The gas leaves the jar through a tube about the size of a telegraph wire. The other end of the tube connects with the burner. The great advantage attributed to the new illuminant is its inexpensiveness. A 22-pound cylinder at 15 cents a pound would give a 50-candlepower light for four months burning four hours a day.

National Drainage Association.—The Secretary of the Association announces that he has received letters from all parts of the United States, indicating that there will be a large gathering of delegates in attendance at the National Drainage Congress, which is to be assembled in Washington, D. C., May 12. Not only have the Governors of the States been requested to appoint delegations, but the Mayors of many of the large cities have been asked to confer with the Boards of Trade and Chambers of Commerce of their respective cities, with the design of having representatives from these organizations appointed to attend the Congress. It is expected the meeting will be held in the banquet hall of the New Willard Hotel, which will be the headquarters of the National Drainage Association during the period of the congress. Commissioner Macfarland has accepted the invitation to deliver the address of welcome to the delegates.

Calendar of Meetings

May 6.

American Society of Civil Engineers.—Regular meeting at the House of the Society, 220 West Fifty-seventh street, New York City.—Charles Warren Hunt, Secretary.

May 11-16.

American Water Works Association—Twenty-eighth annual convention, Washington, D. C.—J. M. Diven, Secretary, 14 George street, Charleston, S. C.

May 14-16.

New York State City Clerks' Association—First convention, Schenectady, N. Y. Frank L. Fonda, City Clerk, Schenectady, N. Y.

May 19-22.

National Electric Light Association.—Annual meeting, Chicago, Ill.—W. W. Freeman, Secretary, Engineering Societies Building, 29 West Thirty-ninth street, New York City.

May 26-28.

National Fire Protection Association.—Annual meeting, Chicago, Ill.—W. H. Merrill, Jr., Secretary, 382 Ohio street, Chicago, Ill.

June 2-7.

International Association of Chiefs of Police.—Fifteenth annual convention, Detroit, Mich.—Major Richard Sylvester, President, Washington, D. C.

June 17.

North West Ohio Volunteer Firemen's Association.—Thirty-fifth annual convention, Napoleon, Ohio.—J. H. Polher, Secretary.

June 23-26.

American Society of Civil Engineers.—Annual convention, Denver, Col.—Charles Warren Hunt, Secretary, 220 West Fifty-seventh street, New York City.

June 23-26.

American Society of Mechanical Engineers.—Annual convention, Detroit, Mich.—C. W. Rice, Secretary, 29 West 39th street, New York City.

June 23-26.

Society for the Promotion of Engineering Education.—(In connection with the convention of the American Society of Mechanical Engineers). Convention, Detroit, Mich.—A. L. Williston, Pratt Institute, Brooklyn, N. Y.

June 23-27.

American Society for Testing Materials.—Annual meeting, Hotel Traymore, Atlantic City, N. J.—Edgar Marburg, Secretary, University of Pennsylvania, Philadelphia, Pa.

June 24-25.

Indiana State Board of Health—General Conference, Indianapolis, Ind. Dr. J. N. Hurty, Secretary.

June 29-July 2.

American Institute of Electrical Engineers.—Annual convention, Atlantic City, N. J.—Ralph W. Pope, Secretary, 33 West Thirty-ninth street, New York City.

PATENT CLAIMS

884,072. Road Culvert. Jay Carey, Vickeryville, Mich. Serial No. 369,205.

A culvert, comprising a bottom section, side and top sections resting at their lower edges upon the bottom section and slidably attached thereto, the meeting edges of the side and top sections at the top being detachably connected by an expansible joint to have a limited circumferential movement without disengagement, substantially as set forth.

884,352. Road Drag. Fitch H. Beach and Fred S. Beach, Charlotte, Mich. Serial No. 375,705.

A drag comprising blades having vertical parallel portions, a plate lying transversely over the blades and rigidly connecting the same together and means for connecting the drag with a propelling means.

884,421. Street Sweeper. Mathew V. Ruff, Smyrna, Ga. Serial No. 323,757.

A street sweeper comprising a casing and a neck extending therefrom, sweeping machanism housed by the casing and including a main and an auxiliary brush, a conveyer arranged within the neck and within the casing, a deflecting plate pivotally supported in an inclined position by the casing and extending from the main brush to a point adjacent to the conveyer, the lower edge of the plate being designed to contact with the surface over which th sweeper is moved, means for limiting the downward movement of the plate, extensions projecting from the casing, a shaft supported by the extensions, traction and sprocket wheels carried by the shaft and lying within the planes of the sides of the casing, and sprocket chain connections between the sprocket wheels and sweeping mechanism, said chain connections being so guided as to rotate the auxiliary brush in the same direction as the main brush.

834,491. Water Meter. Otto Hiersing, Worcester, Mass., assignor to Union Water Meter Company, Worcester, Mass., a Corporation of Massachusetts. Serial No. 395,557.

In a water meter of the character described, the inner or wheel casing consisting of two oppositely disposed bearing-heads each having an inwardly curved semicircular flange, a central bearing-boss and brace arms supporting said bearing boss; in combination with an intermediate frame consisting of upper and lower ring-members that afford annular seats for said bearing-heads, and a series of upright posts uniting said ring members, and having openings between said posts.

884,607. Telephone Fire-Alarm System. William S. McLewee, Yardley, Pa. Serial No. 310,594.

The combination of a telephone circuit, a source of current, a signal located at the telephone exchange controlled by said telephone circuit, a lever pivotally mounted at one end, said lever connected with one of the wires forming the telephone circuit, a terminal connected with the opposite wire forming said telephone circuit, said lever adapted to contact with said terminal and complete said telephone circuit, a spring to act upon said lever, a cam to actuate said lever against the action of said spring, a shaft on which said cam is mounted, a gear-wheel on said cam shaft, a driving shaft having a gear-wheel meshing with the said gear-wheel upon said cam shaft, a crank upon said driving shaft and a weighted handle on said crank to normally stop said cam in a position in which said lever will be out of action.

884,650. Disk Water Meter. Henry Fredrick, Newark, N. J. Serial No. 349,015.

An improved water meter comprising a base portion having a cover thereon to form a disk chamber, the base portion being made of one piece and having an inlet port and an outlet port, one of the ports opening directly into the disk chamber, the base portion having a passage to conduct water from the other port to the disk chamber at a point adjacent to the first port, a partition in the disk chamber, a disk and its ball in the disk chamber, a casing on the top of the base portion, a registering mechanism therein, and an operative connection between the disk and the registering mechanism.

884,667. Concrete-Mixer. Philip A. Koehring, Milwaukee, Wis. Serial No. 381,008.

In a concrete-mixer of the class described, the combination of a revolvable drum provided on its inner walls with an annular series of elevating and mixing buckets, means for delivering the ingredients into said drum, a discharge trough having a receiving end extended within said drum, a slidable hood adapted to cover the receiving end of said trough, means for shifting said hood into and out of covering position whereby the contents of said drum may at the will of the operator be caused to fall into the receiving end of said trough or back into the lower portion of the drum.

THE WEEK'S CONTRACT NEWS

Relating to Municipal and Public Work—Street Improvements—Paving, Road Making, Cleaning and Sprinkling—Sewerage, Water Supply and Public Lighting—Fire Equipment and Supplies—Buildings, Bridges and Street Railways—Sanitation, Garbage and Waste Disposal—Police, Parks and Miscellaneous—Proposals and Awards

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all Our sources of information are believed to be reliable, but we can not guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also corrections of any errors discovered.

BIDS ASKED FOR

STATE	CITY	RECEIVED UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
Street Improvements				
Indiana	Brazil	May 7, 11:30 A.M.	Constructing 21,303 ft., 3 gravel roads	James L. Burnes, Co. Auditor.
Ohio	Cincinnati	May 7, noon	Macadamizing, granite curb, gutter, etc., Bryant ave.; granite block paving, grading curb, etc., Harrison Ave	John J. Wenner, Clk. Bd. Pub. Serv.
Wisconsin	Fond du Lac	May 7, 2 P.M.	Cement paving, Forest Ave.; brick, W. 1st St.; macadam, or brick, Butler and Court Sts.; total cost, $44,132	L. A. Pettibone, City Engineer.
New Jersey	Westwood	May 7, 3 P.M.	Macadamizing 3 avenues in River Dale	Geo. H. Sedman, Chm. Twp. Com.
New York	New York	May 7, 3 P.M.	Repairing asphalt paving where directed; also furnishing 105,000 asphalt block on Riverside Drive	Henry Smith, Pres. Park Bd.
Pennsylvania	Monessen	May 7, 4 P.M.	Brick paving, 6,450 sq. yds.; curb, 5,308 ft.; rough curb, 216 ft.	J. F. Irwin, Boro. Engineer.
Pennsylvania	Altoona	May 7, 8 P.M.	Vit. brick paving on concrete, curb, etc., under 52 ordinances	J. B. Andrews, Pres. B. P. W.
Ohio	Cleveland	May 7	Furn. wood paving block for Abbey Av. viaduct	A. R. Callow, Sec'y Bd. Pub. Serv.
Mississippi	Vicksburg	May 7	Bldg. and maintaining 1st and 2d-class roads for 2 years	Bd. County Supervisors.
Pennsylvania	Erie	May 7	Paving 8 streets, resurfacing French St.	B. E. Briggs, City Engineer.
Ohio	Cincinnati	May 8, noon	Macadamizing, brick gutters, etc., 4 sts.; also brick paving, grading, etc., Addison St	JohnJ. Wenner, Clk., Bd. Pub. Serv.
Ohio	Cincinnati	May 8, noon	Improving Spring Grove Ave.; Specification No. 728	Fred Dreihs, County Clerk.
Ohio	Paulding	May 8, 2 P.M.	Grading, macadamizing, etc., Wyatt pike, 3 sections; 37,302 ft. long, 26,726 and 26,546 ft., inc. stone approaches	C. L. Straw, Engineer.
Ohio	Columbus	May 8	Asphalt, brick, block, etc., paving, portions several streets	E. W. Hirsch, Sec'y Bd. Pub. Serv.
Ohio	Youngstown	May 8	Paving stone sidewalks, crossings, etc	W. H. McMillin, Clk. B.P.S
Wisconsin	Racine	May 9, 10 A.M.	Grading portions of Peck Ave. and Wilson Sts	P. H. Connolly, Chm. Bd. Pub. Wks.
New Jersey	Salem	May 9, 2:30 P.M.	Bldg. Penn's Grove and Dancers Mill road, 3.2 miles	J. F. Ayres, Bd. Freeholders.
New York	Madison Barr'ks	May 11, 2 P.M.	Bldg. 86,000 ft. macadam road; resurfacing 14,500 ft. road; constructing 32,500 ft. concrete walks	C. J. Nelson, Q. M., U. S. Army.
New Jersey	Albert Lea	May 11, 7:30 P.M.	Constructing cement curb and drain, etc., Newton St	C. J. Dudley, City Clk.
Ohio	Dayton	May 11	Furnishing 8 or more carloads of asphalt	W. A. Budroe, Clk. Bd. Pub. Serv.
New Jersey	Newark	May 11	Furn. 1½-in. stone and trap-rock dust on various Co. roads	Jno. Barrett, Bd. Freeholders.
New Jersey	Jersey City	May 11	Repaving, Belgian block, 12,500 sq. yds, W. Newark Ave	Geo. T. Bouton, Clk., S. & W. Com'rs.
Minnesota	Cloquet	May 11	Constructing cement sidewalks	Jos. Loisel, City Clerk.
Virginia	Dinwiddie	May 11	Constructing 7 miles of gravel road	Bd. County Supervisors.
Ohio	Cincinnati	May 12, noon	Brick and macadam paving, grading, curbing, etc	John J. Wenner, Clk. Bd. Pub. Serv.
North Dakota	Minot	May 12, 2 P.M.	Constructing grades	J. W. Fabrick, County Auditor.
Kentucky	Paducah	May 12, 3 P.M.	Paving, 10,320 sq. yds.; new granite curb, 2,300 ft.; redress and reset, 1,930 ft. limestone curb; granitoid gutters, 4,600 ft., granitoid walks, 33,530 sq. ft	L. A. Washington, City Engineer
Indiana	Shirley	May 12, 7 P.M.	Laying 5,936 sq. ft. cement walk; 2,315 ft. curb, etc	Wm. F. Keller, Pres. Town Trus.
New York	Dunkirk	May 12	Street paving, 15,800 sq. yds.; brick paving, 2,100 sq. yds	L. N. Murray, City Clerk.
Texas	Houston	May 12	Paving 5 miles W. Montgomery road; 3 miles P. Junc. road., etc.	John B. Ashe, County Auditor.
Ohio	Plymouth	May 12	Improving four miles of road in township	Albert Kirkpatrick, Tp. Clerk.
New Jersey	Freehold	May 13, 11 A.M.	Bldg. Keyport and S. Amboy road, 1.2 miles long	H. S. Sproul, County Engineer.
Dist. of Col'bia	Washington	May 14, 2 P.M.	Furn. for fiscal yr., begin. July 1: granite curbs, asphalt paving block, vit. paving block; Portland cement, castings, sewer pipe, etc	Jay J. Morrow, Eng. Com'r.
Wisconsin	Fond du Lac	May 14, 3 P.M.	Paving certain streets with brick; 11,000 sq. yds	J. F. Hohensee, Clk., Bd. Pub. Wks.
Kansas	Lawrence	May 14, 5 P.M.	Paving Vt. St.; 600 cu. yds. earth exc.; 2,000 sq. yds. brick paving, Henry St.; 1,800 yds. exc.; 4,000 yds. brick pave.; 2,000 ft. curb	F. D. Brooks, City Clerk.
New Hampshire	Concord	May 14	Grading and surfacing native stone, 400 ft. main road, Chester; grading and gravel 2,000 ft. in Newton	A. W. Dean, State Engineer.
Ontario	Petrolia	May 15, 6 P.M.	Laying 6,000 sq. yds.vit. brick with cement curb on Main St	J. McHattie, Town Clerk.
Wisconsin	Racine	May 16, 10 A.M.	Brick paving, 27,703 sq. yds.; stone curb; reset, 11,300 lin. ft.	P. H. Connolly, City Engineer.
Indiana	Indianapolis	May 16, 10 A.M.	Bldg. Wm. D. Spray joint-free gravel road	C. F. Cromwell, County Auditor.
Indiana	Frankfort	May 16, 10 A.M.	Constructing 5,360 ft. gravel road, bet. Boone & Clinton Cos.	Charles F. Cromwell, Co. Auditor.
Ohio	New Lexington	May 16, noon.	Labor and material for paving; cost, $75,000	Charles A. Beard, City Clerk.
South Dakota	Ashton	May 16, 1 P.M.	Grading 8 miles in Jefferson township	O. B. Olsen, Clk., Town Bd., Jeff.
Pennsylvania	Washington	May 16	Piking 2½ miles broken limestone roads, 1,425 cu. yds	Road Supervisors, Donegal Twp.
New Jersey	New Brunswick	May 18	Paving 20,000 sq. yds., Throop Ave., with brick	Fred. C. Schneider, City Eng'r
Minnesota	St. Paul	May 18	Constructing several county roads	Edw. G. Krahmer, Co. Auditor.
Indiana	Muncie	May 19, 2 P.M.	Furn. material, grading, brick paving, 17,865 sq. yds., W. and, E. Main and Liberty Sts.	John. O. Potter, City Engineer.
New York	Hornell	May 19, 3 P.M.	Grading curb, vit. brick or block on concrete, Pleasant St. and portions Genesee, E. and N. Main Sts.; 13,160 yds. paving; 7,660 ft. curb	Frederic Leach, Supt. Pub. Wks.
Ohio	Mt. Gilead	May 21	Constructing Nickles stone and gravel road, Washington tp	W. C. McFarland, Co. Auditor.
Ohio	Celina	May 23	Macadamizing, grading, etc., 9 miles road	L. L. Marsh, Engineer.
Pennsylvania	Erie	May 25	Paving 7th St., from Cherry to Plum St.	B. E. Briggs, City Engineer.
Mississippi	Gulfport	May 26, 8 P.M.	Constructing, complete, 14,000 sq. yds. paving; 15,000 lin. ft. concrete curb and gutter; 15,000 lin. ft. granite curb	M. F. Sullivan, City Engineer.
Iowa	Le Mars	May 28	Constructing sidewalks on certain streets	V. D. Hoffman, City Clerk.
Ohio	Cleveland	May 29	Laying cement sidewalks in certain streets	A. R. Callow, Sec'y Bd. Pub. Serv.
New York	Fort Slocum	June 1, 11 A.M.	Constructing roads, sidewalks, gutters, drains, etc	Constr. Q. M., U. S. Army.
Indiana	Crawfordsville	June 8	Paving 5 blocks on College, Water and Walnut Sts	B. R. Johnston, City Engineer.
Water Supply				
Minnesota	White Bear	May 8, 8 P.M.	Ext. water mains, inc. 1½ miles pipe line, specials, etc	Oscar Claussen, C. E., St. Paul.
Iowa	Sioux City	May 11, noon.	Bldg. pumping and power plant, inc. machinery, etc	E. E. Hosmer, County Auditor.
New Jersey	Bridgeton	May 11, noon.	Repairing water works reservoir	Wm. Daniels, Chm. Water Com.
New York	New York	May 12, 11 A.M.	Constructing pressure tunnel under Walkill river, inc. exc., structural steel, pumping plant, masonry, air compressors, etc., cost, $4,000,000 or $5,000,000	J. Waldo Smith, Ch. Eng'r Bd. Water Supply.
Oregon	Portland	May 12, 2 P.M.	Furn. gate valves, c. i. pipe, wood-stave pipe, etc	Frank T. Dodge, Supt. Water Bd.
Nebraska	Deshler	May 12, 8 P.M.	Labor and material for water works system, inc. pumping station, complete; tubular well; deep well, power pump; gasoline engine; steel tank and tower; pipe line distribution system	W. E. Philby, Village Clerk.
Mississippi	Alcorn	May 12	Artesian well, water pipe, Alcorn Col. water system	J. P. Savage, Chairman.
Arkansas	Fort Smith	May 12	Constructing water system at new County Hospital	A. Klingensmith, Arch.

Water Supply—*Continued.*

New York	New York	May 13, 2 P.M	Furn. 6-in. inside screw-gate valves and 32-tons hydrant gate valve boxes and covers; laying 30-in. force main, etc., in Queens Boro; relaying 12 and 20-in. mains through bridge in Bronx	John H. O'Brien, Com'r W. S. G. & E.
Georgia	Atlanta	May 13	Bldg. pump house, foundations, etc., Hemphill Sta. No. 2	Park Woodward, Gen. Mgr. W. W.
Ohio	Bryan	May 13	Furn. and laying 4,130 ft. 4-in., and 3,800 ft. 6-in. hub and spigot c. i. pipe; also 1,500 lbs. specials, hydrants, valves, etc.	R. L. Starr, Pres. Bd. Pub. Serv.
Louisiana	Ft. St. Philip	May 15, 10 A.M	Constructing water and sewer system at Fort	Capt. Arthur Cranston, U. S. Army.
Colorado	Canon City	May 15	New water supply systems; cost, $250,000	P. O'Brien, Civil Engineer.
Nebraska	Hildreth	May 15	Constructing water works, to cost $10,000	M. A. Earl & Co., Muskogee, Okla
Ontario	Guelph	May 18, noon	High-duty pumping engine, 2½ or 3 million gal.; steel or rein. concrete water tower, 30 ft. diam., 100 ft. high and concrete foundation; 3,000 ft., 12-in. c. i. pipe, etc	J. J. Hackney, Mgr. Water Works.
Iowa	Council Bluffs	May 18, 4 P.M	Constructing water works plant, embracing power plant complete, settling reservoirs, distributing system and high-pressure reservoir. S. L. Etnyre, City Engineer	W. F. Sapp, City Clerk.
Colorado	Canon City	May 20, 8 P.M	Furn. material and laying 8 miles 26 or 30-in. conduit of steel or continuous wood stave pipe: settling basin; filter; 2 clear-reservoirs, etc., for water works system	L. S. Dawson, City Clerk.
Montana	Ft. Assinniboine	May 21, 11 A.M	Constructing 150,000 gal. steel tank and tower	J. E. Sawyer, U. S. Army, St. Paul, Minn.
New Mexico	Roswell	May 22, 2 P.M	Furn. 2,100 tons c. i. pipe and specials, 4 to 16-in. or 20 miles Converse Lock Joint steel pipe; hydrants and valves; 2,000,000-high-duty Corliss pumping engine and dir.-act. pump, etc.; 2 18′ x 66″ hor. ret. tub. boilers; also furn. all material and labor, except above, and constructing complete water works system	Burns & McDonnell, K. C., Mo., Eng.
Mississippi	Columbus	May 30	Plans, etc., for bldg. 50,000-gal. steel tank on 100-ft. steel tower	H. L. Whiteford, Pres. Indus. Inst.
Illinois	Grafton	June 1	Constructing $22,000 water works and electric light plant	W. S. Merkel, St. Louis, Mo., C. E.

Sewerage

Ohio	Cincinnati	May 7, noon	Constructing sewers and drains in Fairmount Ave	John J. Wenner, Clk. Bd. Pub. Serv.
Ohio	Youngstown	May 8, noon	Furn. material and sewering portion of Dewey St.	W. H. McMillin, Clk. B. P. S.
Ohio	Dayton	May 8, noon	Constructing storm water sewers in various streets and alleys	W. A. Budroe, Clk. Bd. Pub. Serv.
North Dakota	Minot	May 8, 2 P.M	Galv. iron cor. metal road culverts, 12-72-in. diam.	J. W. Fabrick, Co. Auditor.
Missouri	St. Louis	May 8	Bldg. sewers: 7,386 ft. 12 to 21 in.; also 165 ft. of 18′ 2″ x 29′ rein. concrete closed and 850 ft., 29 ft. wide open sewer of riprap and stone, etc	A. J. O'Reilly, Pres. Bd. Pub. Imp.
Indiana	Indianapolis	May 10	Bldg. Morris and River Ave. sewer; 10-in. pipe to 7-ft. circ. brick or concrete tube, cost, $120,000; also $15,000 sewer	Blaine H. Miller, City Engineer.
Ohio	Cincinnati	May 11, noon	Material and labor for sewers on three streets, six avenues	John J. Wenner, Clk. Bd. Pub. Serv.
Minnesota	Cloquet	May 11, noon	Constructing sanitary sewer, 1,900 ft. long	Jos. Losiel, City Clerk.
Pennsylvania	Gallitzin	May 11, noon	Bldg. vit. pipe and concrete sewer, St. Thomas and Church Sts.	Henry & Dillman, Altoona, Engrs.
New Jersey	Irvington	May 11, 2 P.M	Bldg. 6 catch basins and iron pipe on Grove St.	G. F. Drum, County Engineer.
New York	Mt. Kisco	May 11, 8 P.M	Constructing about 13 miles sewers, i & c. trunk sewer	Fred. Carpenter, Clk. Bd. Trus.
New Jersey	Ridgefield Park	May 11	Constructing sewers and drains in 3 streets	Sam'l J. Shaw, Village Eng'r.
Minnesota	Redwood Falls	May 12, 2 P.M	Constructing tile and open ditch No. 10; cost, $35,041	L. P. Larson, County Auc.
Ohio	Toledo	May 12	Furn. material and building sewers in various streets and alleys	Reynold Voit, Sec'y B. P. B.
Arkansas	Fort Smith	May 12	Constructing sewer system at new County hospital	A. K. Klingensmith, Arch.
Louisiana	Ft. St. Philip	May 15, 10 A.M	Constructing sewer and water system at post	Capt. Arthur Cranston, U. S. Army.
Missouri	Cape Girardeau	May 18, 7:30 P.M	Bldg. complete sewer system for Sewer Dist. No. 1	C. C. Hawley, City Engineer.
Ohio	Steubenville	May 18	Constructing pipe sewer on Rose St.	H. G. Simpson, Clk. Bd. Pub. Serv.
Indiana	Bloomington	May 19, 4 P.M	Constructing 10.7 miles of sanitary sewers and purification plant, to cost, $102,136	U. S. Hanna, City Engineer.
Indiana	W. Lafayette	May 19	Constructing sewers in several streets	C. P. Stellard, Town. Clerk.
Ohio	Oberlin	May 19	Bldg. sewer-bid system, to cost $16,000	H. T. Marsh, Village Clerk.
Wisconsin	Beloit	May 22, 10 A.M	Constructing storm water sewer in several streets	J. A. Love, Chm. Bd. Pub. Wks.
New Mexico	Roswell	May 22, 2 P.M	Furn. 8 miles 8 to 18-in. sewer pipe; mat. and building sewer system complete, except pipe; furn. material and building septic tank	John W. Poe, Chm. W. & S. Com's.
Pennsylvania	Ardmore	May 23, noon	Laying 2,450 ft. 12-in. and 2,050 ft. 10-in. t. c. sewer, Merion Ave.; 3,000 ft. 8-in. Highland Ave., 5 to 18 ft. deep, including 27 manholes, etc. in Merion and Overbrook	Township Com. 205 Mahon Bldg.
Mississippi	Gulfport	May 26, 8 P.M	Labor and material: 15,190 ft. 24 to 6-in. vit. pipe sewers and 2 concrete bulkheads for outfall; 23 manholes; 36 catch basins, 10 gutter basins, etc	M. F. Sullivan, City Engineer.
Maryland	Baltimore	May 27, 11 A.M	Bldg. storm water drains, Court No. 4, inc. 3,902 ft., 36 to 114-in. and 109 ft. 66 x 84-in. drain; 16,095 ft. 12 to 33-in. drain, 892 ft. manholes, 502 inlets, etc	Peter Leavy, Jr., Chm. Sewer Com'n.
Ontario	Osnabruck Centre	June 1, noon	Constructing Grantley Creek drain: cost, $14,106.77	Magwood & Walker, Cornwall Engineers.
Michigan	Saginaw	June 1	Constructing pipe sewers, to cost $25,000	R. W. Roberts, City Engineer.
Louisiana	New Orleans	June 30, 3 P.M	Furn. and erecting two 100 k.w., 250 volt., dir. con. generators; two 75 h.p., 250 volt motors; one 2,500,000-gal. turbine pump and 1,000,000-gal. triplex pump, to work against 125-ft. head, dir. con. to electric motor; 2,000,000 cen. pump; two 4,000,000 cen. pump units; two 5 h.p. 250 volt motors; one surface condenser, 6,500 lbs. steam per hr.; air pump; piping, valves, wiring, switchboard, etc	George G. Earl, Gen. Supt. S. & W Board.

Public Buildings

New York	New York	May 7, 10:30 A.M	Additions and alterations, 3 bldgs. for Fire Dept.	Nicholas J. Hayes, Fire Com'r.
New York	New York	May 7, noon	Bldg. new ferry house, Man. terminal, Whitehall St.	Allen N. Spooner, Com'r Docks.
Connecticut	Meriden	May 7, noon	Erecting State armory, Chas. S. Palmer, Arch.	Adjutant General, Hartford.
Iowa	Glenwood	May 7, noon	Constructing addition to Court House	B. T. Agau, County Auditor.
Pennsylvania	Lancaster	May 7	Building 2-story, 12-room brick school; also heating, etc	C. Emlen Urban, Architect.
Missouri	Webster Grove	May 7	Bldg. 2 schools: M. P. McArdle, Arch., Chemical Bldg., St. Louis	Bd. Directors, School Dist.
North Dakota	Lisbon	May 7	Erecting armory, plans of Haxby & Gillespie, Fargo, Arch'ts.	S. D. Adams, Sec'y Armory Bd.
Louisiana	New Orleans	May 8, 11 A.M	Bldg. rein. concrete bldgs. at Burrwood, S. W. Pass	Col. E. H. Ruffner, Custom House.
New York	Rochester	May 8	Plumbing, heating, etc., for new Clifford St. school	J. Foster Warner, Arch.
Ohio	Ashtabula	May 9, noon	Low-pressure comb. steam heat, etc., plant, 8-room school	J. L. Wilson, Architect.
Dist. of Col'bia	Washington	May 9, noon	Plastering, wood trim, mantel pieces, etc., Senate Of. Bldg.	Elliott Woods, Supt. Capitol.
Arizona	Douglas	May 9, 1 P.M	Constructing detention hospital for County	Dr. W. A. Greene, Co. Supt. of H'th.
Oregon	Eugene	May 9, 3 P.M	Constructing, complete, U. S. Post Office	James Knox Taylor, Wash., D. C
Pennsylvania	Phoenixville	May 9	Constructing State Armory	State Armory Board, Harrisburg.
Indiana	Evansville	May 9	Erecting school; plans Harris & Shoppell, 124 E. 4th St.	School Board.
New York	New York	May 11, 11 A.M	Repairs, alterations, etc., 17 school buildings	C. B. J. Snyder, Supt. School Bldgs.
Washington	Seattle	May 11, noon	Bldg. armory, etc., complete; cost, $130,000	Kerr & Rodgers, Architects.
Minnesota	Duluth	May 11, noon	Erecting County Court House; bid as whole or separate	Geo. H. Claypool, Sec'y Com'n.
Indiana	Madison Twp.	May 11, noon	Bldg. brick school; N. O. Kelley, Trus. R. route, Misha. No. 1	Freyermuth & Maurer, South Bend, Architects.
California	Los Angeles	May 11, 2 P.M	Bldg. 2-story and base. annex to Co. jail, etc.; separate bids	C. G. Keyes, County Clerk.
Michigan	Houghton	May 11, 2 P.M	Erecting library and museum bldg., Mich. Col. of Mines	Charlton & Kuenzli, Marquette, Archts.
New York	Brooklyn	May 11, 2:30 P.M	Laying new floor and base throughout Cumbld. St. Hosp	R. W. Hebberd, Com'r Charities.
Maine	Calais	May 11, 3 P.M	Constructing, complete, Federal Building	James Knox Taylor, Wash. D. C.
Ohio	Cincinnati	May 11	Bldg. School; Tietig & Lee, Archts., Com.-Trib. Bldg	Dr. J. M. Withrow, Chm. Bd. Ed'n.
Texas	Lockhart	May 11	Bldg. $25,000 fireproof jail for Caldwell County	Judge John W. Gambrill.
Saskatchewan	Prince Albert	May 11	Bldg. $75,000 high school; 3 per cent. for plans, etc., accepted	C. O. Davidson, Sec'y-Treas.
Ohio	Conneaut	May 11	Bldg. 25,000 Carnegie Library	H. G. Kingdon, Treas. Library Trus.
North Dakota	Grafton	May 11	Erecting Court House	Jos. B. De Renner, Grand Forks, Arch.

Public Buildings—*Continued.*

Ohio	Chesterhill	May 11	Erecting a Union Town Hall, F. E. Elliott, Lorain, Arch	Bd. Trus. Marion township.
Pennsylvania	Pittsburg	May 11	Alterations, etc., Central high school; cost $50,000	Chas. Reisfair, Sec'y Cen. Bd. Educ.
Connecticut	New Britain	May 11	Remodeling City Hall; McKim, Mead & White, N. Y. City, Architects	City Hall Commission.
Arkansas	Little Rock	May 12, noon	Erecting a library; also plumbing, heating, wiring	Charles L. Thompson, Architect.
New York	New York	May 12 3 P.M.	Remodeling U. S. Assay Office	James Knox Taylor, Wash., D. C.
Alabama	Fort Morgan	May 14, 1:30 P.M.	Construction, etc., barracks, mess hall, and 2 other buildings	Capt. L. F. Garrard, U S. Army.
New York	Albany	May 14, 3 P.M.	Bldg., complete, bldgs. at Midd. & Bing. State hospitals	E. E. McGarr, Sec'y St. Com'n. Lunacy.
Pennsylvania	Pittsburg	May 15, 10:30 A.M.	Erecting 2 fire engine houses, repairs, etc., to another	E. G. Lang, Dir. Dept. Pub. Safety.
South Dakota	St. Onge	May 15, 1 P.M.	Bldg. addition to school; Dist. No. 29	Daniel Power, Clk., School Dist. 29
Pennsylvania	Wilkes-Barre	May 15, 2 P.M.	Painting, decorating, etc., interior new Court House	James M. Norris, Co. Controller.
Arkansas	Argenta	May 15, 4 P.M.	Alterations to high school, also heat plant; fire escapes	C. J. Humphrey, Sec'y School Bd.
Ohio	Love City	May 15, 7 P.M.	Bldg. 4-room brick school	David A. Potts, Clk. Bd. Educ.
Ohio	Madisonville	May 15	Bldg. $100,000 24-room school; J. R. Klein, Clk. Bd. Educ'n.	Dlausmith & Drainie, Archs., Cinc'ti.
Porto Rico	San Juan	May 15	Constructing a military hospital	Wm. S. Patten, Q. M., N. Y., City.
North Dakota	Binford	May 16, 1 P.M.	Bldg. 4-room stone and brick school	Hancock Bros., Archs., Fargo.
Connecticut	New Britain	May 16, 3 P.M.	Constructing, complete, U. S. Post Office	James Knox Taylor, Wash., D. C.
Minnesota	Gilbert	May 16	Erecting $50,000 high school	Bray & Kystrom, Duluth, Archs.
North Dakota	Jamestown	May 16	Erecting new $75,000 bldg. for State Hospital for Insane	M. E. Beebe, Fargo, Arch't.
Ohio	Ironton	May 19, 10 A.M.	Fixtures and furniture for new County Court House	A. C. Robison, County Auditor.
Georgia	Thomaston	May 19	Bldg. 3-story County Court House, 64 x 94 ft.; cost, $50,000	M. H. Sandwich, Clk. Co. Com'rs.
Washington	Ft. Spokane	May 20, 2 P.M.	Bldg. 5-day school plants for Indians	Capt. J. A. Webster, Indian Agt.
Ontario	St. Catharines	May 20	Comp. plans, etc.; 6-room school; good vent., light, etc	J. B. Malcolmson, Sec'y School Bd.
Mississippi	Oxford	May 20	Plans, etc., for $50,000 dormitory; $25,000 dining hall, etc	D. M. Kimbrough, Chm. Bldg. Com.
California	Riverside	May 20	Additions and alterations to Co. jail; cost, $12,000	Board Co. Supervisors.
New York	Buffalo	May 21, 3 P.M.	Constructing, complete, U. S. Marine Hospital	James Knox Taylor, Wash., D. C.
South Dakota	Fort Meade	May 25, 10 A.M.	Bldg. 5 sets officers' quarters, plumbing, heating, etc	Constructing Q. M., U. S. Army.
South Carolina	Chester	May 25, 3 P.M.	Constructing, complete, U. S. Post Office	James Knox Taylor, Wash., D. C
Virginia	Richmond	May 25	Plans for ad. and imp. to library bldg., etc.; cost, $85,000	Geo. P. Mundy, Sec'y Capitol Com'n.
Ohio	Port Clinton	May 25	Bldg. $25,000 school; Wurmser & Elliott, Lorain, Archts	Board of Education.
Alabama	Florence	May 26, 3 P.M.	Constructing, complete, U. S. Post Office	James Knox Taylor, Wash., D. C.
Texas	Houston	May 28, 3 P.M.	Constructing, complete, Federal Building	James Knox Taylor, Wash., D. C.
Mississippi	Columbus	May 30	Bldg. $15,000 gym., etc.; $25,000 library Indus. Inst. & Col.	H. L. Whitfield, Pres. College.
Mississippi	Agricultural Col.	May 31	Bldg. $100,000 chapel and academic bldg., complete	A. J. Moore, Sec'y A. & M. College.
Nebraska	Grand Island	June 1, 3 P.M.	Constructing, complete, U. S. Post Office	James Knox Taylor, Wash., D. C.
Pennsylvania	Wilkes-Barre	June 1	Competitive plans for $300,000 high school, 24 rooms and aud	Dr. G. W. Guthrie, Pres., School Bd.
New York	Albany	June 2, noon	Constructing N. Y. State Education. Building; cost $3,500,000; Washington St.	R. H. Fuller, 63 Wm. St., N. Y. City.
Minnesota	New Ulm	June 2, 3 P.M.	Constructing, complete, U. S. Post Office	James Knox Taylor, Wash., D. C.
Virginia	Richmond	June 2	Comp. designs for comb. market and armory; also bids for erecting bldg., inc. arch's. fee; cost, $100,000	C. E. Bolling, City Engineer.
Michigan	Detroit	June 3, 3 P.M.	Extending, remodeling, etc., Federal Building	James Knox Taylor, Wash., D. C.
New Hampshire	Dover	June 8, 3 P.M.	Constructing, complete, U. S. Post Office	James Knox Taylor, Wash., D. C.
Missouri	St. Charles	June 12, 3 P.M.	Constructing, complete, U. S. Post Office	James Knox Taylor, Wash., D. C.
Wisconsin	Rhinelander	July 20	Constructing 3-story Court House; cost, $100,000; stone, fire-proof construction, 120x95 ft. A. Taylor, Chm. Co. Com'rs.	C. H. Tegen, Manitowoc, Arch
Oregon	Portland	June 25	Plans for $250,000 high school	Board of Education.
Minnesota	St. Paul	August 1	Competitive plans for Mechanical Arts High School, 62 rooms; Architects all over country invited to submit plans.	Com. on Schools, School Bd.

Bridges

Indiana	Logansport	May 7, 10 A.M.	Painting 3 bridges over Eel River and one over Wabash	George W. Cann, County Auditor.
Connecticut	Bridgeport	May 7, noon	Bldg. new floor beams, Stratford Av. drawbridge	Chas. Biltz, Dir. Pub. Wks.
Mississippi	Vicksburg	May 7, noon	Bldg. steel bridge over Clear Creek on Road No. 23	J. D. Laughlin, Chancery Clerk.
New York	Brooklyn	May 7, 2 P.M.	Bldg. bridge floor Metropolitan Ave. bridge	J. W. Stevenson, Com'r bridges.
Colorado	Parker	May 8, noon	Bldg. 50 ft. span rein. concrete bridge over Tallman Creek	T. W. Jaycox, State Engr., Denver
Ohio	Wauseon	May 8, 1 P.M.	Sub and superstructures of four bridges	J. E. Merrill, County Auditor.
Oregon	Eugene	May 8, 2 P.M.	Constructing County bridge over Brumbaugh Creek	E. V. Lee, County Clerk.
Ohio	Washington C. H.	May 8, 2 P.M.	Bldg. sub. and superstructure 2 bridges	H. D. Chaffin, County Auditor.
Indiana	Richmond	May 9, 11 A.M.	Bldg. 1 bridge and retaining wall; repairing 3 bridges	County Auditor.
Oregon	Vale	May 9, 1 P.M.	Bldg. 80-ft. span; wood, steel or stone arch	B. W. Mulkey, Clk. Co. Com'rs.
Washington	Mt. Vernon	May 9	Bldg. 264 ft. span steel bridge; cost $15,000 to $20,000	Waddell & Harrington, K.C.Mo., Eng.
Manitoba	Virden	May 10, noon	Bldg. steel bridge, stone mason abutments, etc	James F. C. Menlove, Sec'y-Treas.
Ohio	Chillicothe	May 11, noon	Constructing concrete arch culvert	Ross County Auditor.
New Jersey	Newark	May 11, 1:30 P.M.	Bldg. concrete arch bridge, Glen Av., Millburn tp	G. F. Drum, County Engineer.
Idaho	Rathdrum	May 11	Bldg. bridge over Coeur d'Alene River, near Lane, 140-ft. span, with approaches, over 1,000 ft.; comb. steel and wood or steel	County Commissioners.
South Carolina	Beaufort	May 11	Steel drawbridge at Port Royal Ferry, Whale Branch	W. F. Brown, C. E., Savannah, Ga.
Utah	Ogden	May 11	Bldg. 65-ft. span rein. concrete arch over Ogden River	A. F. Parker, City Engineer.
Indiana	Indianapolis	May 12, 10 A.M.	Constructing bridge over branch of Lick Creek	County Auditor.
Ohio	Hamilton	May 12, 10 A.M.	Repair of bridge abutment in Milford township	J. E. Brate, County Auditor.
Louisiana	E. Baton Rouge	May 12, 10 A.M.	Bldg. $600 modern bridge over Comite River	F. A. Woods, Secy. Police Jury.
Texas	Houston	May 12, noon	Replacing bridge over Spring Creek on Hockley road	John B. Ashe, Co. Auditor.
Texas	Linton	May 12	Iron fence around court house	P. A. Hunter, County Judge.
Colorado	Twin Bridges	May 13, noon	Bldg. 40-ft. span rein concrete bridge over S. Platte	T. W. Jaycox, Denver, State Engr.
Oklahoma	Tulsa	May 14	Constructing 17 bridges	C. F. Rogers, County Clerk
Georgia	Kings Ferry	May 14	Furn. material and building steel drawbridge over river	G. Reuben Butler, Clk. Co. Com'rs.
Virginia	Culpeper	May 14	Building 3-span steel bridge at Rapidan	W. E. Coons, Clk. Circuit Court.
Indiana	Fort Wayne	May 15, 10 A.M.	Steel bridge, 207 x 26 ft. with two 5-ft. walks, Clinton St. over St. Mary's River; also concrete abutments; also 41 concrete culverts, price per cu. yd. to include I-beams and exc.; also plank and I-beams for repair of bridges	Jos. Tonkel, Chm. Bd. Co. Com'rs.
Georgia	Lindale	May 15, noon	Bldg. 84-ft. steel or concrete bridge, 18-ft. rdbd; two 6-ft. walks.	Floyd County Comr's. Rome.
Indiana	Pittsburg	May 15	Erecting new bridges over Wabash river	Carroll County Com'rs, Delphi.
British Col'bia	Vancouver	May 16, noon	Manufacture and erection of 2 new bridges over False Creek Westm. Av. and Granville St.; est. wt. steel, 2,800 tons	City Engineer.
Pennsylvania	Deemston	May 16, 7:30 P.M.	Constructing 2 stone arch bridges	A. J. Leonard, Boro. Clk. R. D. No. 2.
Indiana	South Bend	May 18, 11 A.M.	Bldg. 6 concrete culverts; steel beam bridge, etc	John W. Harbou, Co. Auditor.
Ohio	Upper Sandusky	May 18, noon	Bldg. 142-ft. steel super. and rebldg. stone abuts	J. N. Traxler, County Auditor.
Kentucky	Pikeville	May 18, noon	Sub and superstructure bridge over Big Sandy River	John McDyer, Catlettsburg, C. E.
Georgia	Columbus	May 27, noon	Bldg. steel or rein. concrete bridge over river at Dill St	T. L. Gruzard, Chm. Bridge Com.
Minnesota	Lanesboro	May 30, noon	Bldg. wooden bridges over Root River at Whalen	P. Abrahamson, Clk. Supervisors.

Lighting and Electricity

Alabama	Montevallo	May 8, noon	Bldg. brick power plant and boiler room building	Wm. E. Spink, Arch., Birmingham.
Dist. of Col'bia	Washington	May 9, noon	Electric light fixtures, incandescent lamps, fans and motors, registers and valves, etc., U. S. Senate Office Bldg	Elliott Woods, Supt. Capitol.
Iowa	Sioux City	May 11, noon	Bldg. pumping and power plant, inc. machinery; also repairs hosp. bldg. and electric wiring bldgs. at Poor Farm	E. E. Hosmer, Co. Auditor.
New York	West Point	May 11, noon	Furn. and install electric and gas fixtures in Qrtrs	Quartermaster, Mil. Academy.
California	Folsom City	May 11, 2 P.M.	Constructing electric light plant at Folsom Prison	State Bd. Prison Dirs.
Kentucky	Louisville	May 12, noon	Sale of Fetter electric light franchise	Board of Public Works.
New York	Hudson	May 12, 5 P.M.	Lighting streets and City Hall, 3 or 5 yrs. from Sept. 15	Robert J. Harding, City Engineer.
Alabama	Fort Morgan	May 14, 1:30 P.M.	Lighting fixtures, wiring, plumbing, etc., 4 bldgs.	Capt. L. F. Garrard, U. S. Army.
Pennsylvania	Philadelphia	May 15, 1 P.M.	Furnishing electrical supplies at Frankford arsenal	Commanding Officer.
Colorado	New Fort Lyon	May 16, 11 A.M.	Electric lighting system at Naval Hospital	Adm. R. C. Hollyday, Wash., D. C.
Wisconsin	Juneau	May 18, 1 P.M.	Bldg. electric light plant for Co. Insane Asylum	F. L. Lindsay, Arch., Oshkosh.
Texas	Tyler	May 20, 3 P.M.	Conduit and electric wiring, Federal Bldg. and extension	James Knox Taylor, Wash., D. C.
Mississippi	Oxford	May 20	Com. plans for 35,000 electric light and power plant, etc	D. M. Kimbrough, Chm. Bldg. Com.
Louisiana	New Orleans	May 20	Erecting boiler house and installing proper boiler cap	Bd. Superv. Charity Hospital.
Illinois	Grafton	June 1	Constructing $22,000 electric light plant and water works	W. H. Journey, Mayor.
Dist. of Col'bia	Washington	June 16, 10 A.M.	Furn. quantity electrical hoist equipments, motors, etc., at Newport News, Va., and Quincy, Mass.	E. B. Rogers, P. M. Gen., U. S. Navy.
Louisiana	New Orleans	June 30, 3 P.M.	Electrical and pumping machinery, Algiers station	F. S. Shields, Sec'y S. & W. Bd.

Miscellaneous

New York.....	West Point.....	May 6, noon.....	Furn. stone-crushing plant, steam engine and boiler.....	Quartermaster, Mil. Academy.
Delaware.....	Wilmington.....	May 7, 11 A.M.....	Dredging Mantua Creek, at Mantua, N. J.....	C. A. F. Flagler, Maj. Eng'rs. U. S. A.
Kentucky.....	Hopkinsville....	May 7, noon.....	Fixtures and machinery in bakeshop Ky. Asylum for Insane....	Albert Scott, Bd. Com. Chari. Insti.
Ohio.....	Cincinnati.....	May 7, noon.....	Collection, removal and disposal of garbage, dead animals, etc., one and 5-year periods after June 1.....	Edwin Henderson, City Clerk.
Ohio.....	Canton.....	May 7.....	Putting pipe tunnel in Stark County Infirmary.....	M. W. Oberlin, County Auditor.
New York.....	New York.....	May 8, noon.....	Construction six sections Fourth Ave. subway, Brooklyn: (a) Flatbush Ave. extension, Nassau St. to Willoughby St., Manhattan Bridge, No. 1; (b) Willoughby St. to Ashland Place; (c) Fourth Ave. and Ashland Place to Fulton St. and Sackett St.; (d) Fourth Ave., Sackett St. to Tenth St.; (e) Fourth Ave., Tenth St. to 27th St.; (f) Fourth Ave., 27th St. and 43d St.	Public Service Com'n, 1st Dist.
Illinois.....	Chicago.....	May 9, 10 A.M.....	Dredging Calumet River; bldg. dock, Chicago river.....	W. H. Dixby, Col. Eng'rs U. S. A.
Manitoba.....	Wallace.....	May 10.....	Bldg. and installing telephone lines in rural municipality.....	Jas. F. C. Menlove, Sec'y-Treas.
Rhode Island..	Fort Adams.....	May 11, 10 A.M.....	Bldg. sea wall, removal of face cover, grading, filling, etc.....	Capt. Willis C. Metcalf, Q. M.
Ohio.. ..	Columbus.. ...	May 11, noon.	Constructing garbage reduction works, cap. 100 tons per 24 hrs., on city land, inc design. bldg., delivery, etc .	E. W. Hirsch, Sec'y Bd. Pub Serv
Ohio.....	Cleveland.....	May 11, noon.....	Installing sanitary apparatus in 2 schools.....	Chas. Orr, Supt. of Bldgs.
Indiana.....	Fort Wayne.....	May 12, 8 P.M.....	Furn. first-class fire engine, 2 or 3 horses.....	D. C. McCarthy, Clk. Fire Bd.
Texas.....	Sinton.....	May 12.....	Bldg. iron fence around Court House; concrete or block base....	P. A. Hunter, County Judge.
Michigan.....	Holland.....	May 13, 3 P.M.....	Repairing south pier.....	M. B. Adams, Cl. Engrs., Grand Rapids
Kansas.....	Leavenworth....	May 13.....	Furn. 10,000 fire brick No. 1, 20,000 No. 2, 6,000 arch brick No. 1 stretchers, 12,000 lbs. fire clay; iron fittings for down draft brick kiln at U. S. Penitentiary.....	R. V. LaDow, Dept. Justice, Wash., D. C.
New York.....	Albany.....	May 14, 10 A.M.....	Boilers, pump machinery, etc., Reformatory and Hosp.....	F. B. Ware, State Arch.
Maine.....	Portland.....	May 14, noon.....	Constructing a concrete wharf.....	Maj. Geo. A. Zinn, Const. Eng'r.
Florida.....	Fort Dade.....	May 15, 8 P.M.....	Furn. & install. ice and distilling plant.....	Constructing Q. M., U. S. Army.
Wisconsin.....	Juneau.....	May 18, 1 P.M.....	Erecting central heating plant for Co. Insane Asylum.....	F. L. Lindsay, Oshkosh, Arch.
New York.....	Fort Ontario....	May 20, 11 A.M.....	Constructing iron and wire fence at post.....	A. R. Williams, Q. M., U. S. A.
Florida.....	Fort Pickens....	May 20, noon.....	Constructing sea wall.....	H. B. Ferguson, Capt. Engineers.
Rhode Island...	Ft. Adams.....	May 21.....	Sea wall.....	Capt. Willis C. Metcalf Q. M
Dist of Col'bia..	Washington.....	June 1.....	Furnishing 4,500,000 bbls. Portland cement.....	Isthmian Canal Commission.

STREET IMPROVEMENTS

Moulton, Ala.—An election will be held to vote on the question of issuing $200,000 Lawrence County road bonds.—Address County Auditor.

Oakland, Cal.—Council has given notice of its intention to pave Grove street with asphalt, on concrete base; also to macadamize, etc., a number of streets.—Frank R. Thompson, City Clerk.

Colorado Springs, Col.—Sidewalks have been ordered laid on Vermijo and Costilla streets, between Cascade and Wahatch avenues, and on North Park place, between Cascade avenue and Sierra Madre street.

Council is considering petition to create a paving district in the business section, also the paving proposition in District No. 3.

Griffin, Ga.—Council is preparing to pave certain streets with asphalt.

Savannah, Ga.—Council has passed ordinances providing for paving certain streets with brick on concrete foundation.

Lewiston, Ida.—City Engineer Guilland will submit plans for paving certain streets with wooden blocks.

Chicago, Ill.—An ordinance has been passed providing for paving State street with brick, between Thirty-ninth street and Sixty-third street; estimated cost, $100,000.—S. R. Erickson, City Engineer.

Joliet, Ill.—A proof of notice for cement sidewalks to be constructed at 207, 209, 211 and 213 Second avenue, and at 214 Richards street, was received and placed on file, and a petition for the paving with brick of the first alley beginning at Washington street, between Eastern avenue and Richards street, was adopted by the Board of Local Improvements; the Board is also planning for the paving with asphalt of South Chicago street from where the paving now ends to a point near the city limits south, and Raynor boulevard from Exchange street to Marion street.—John R. Cronin, Mayor.

Petitions have been filed for the pavement with sheet asphalt of Nicholson street, between Campbell street and Western avenue, and for improving with macadam, Whittier avenue, between Western and Buell avenues.

The proofs of notice as published for new sidewalks on the following thoroughfares was made a matter of record: Glenwood avenue, Taylor street and Washington street.

A profile was adopted for paving with brick on alley south of Washington street, between Richards street and Eastern avenue.

Resolutions for a concrete sidewalk on both sides of Bartleson street, from Sherman to Richards streets, were adopted, and ordinance for the same sent to Council; estimated cost, $519.75.—John R. Cronin, Mayor.

Litchfield, Ill.—Council has directed bids to be advertised for constructing sewers, at a cost of $70,000.

Delphi, Ind.—Bids will be received, May 4, for the purchase of $5,800 4½ per cent. gravel road bonds.—M. G. Haun, County Auditor.

Muncie, Ind.—City Engineer Potter is preparing estimates for paving certain streets, at a cost of $25,000.

New Albany, Ind.—The Board of Public Works has decided to improve certain portions of East Tenth street; City Engineer Samuel T. Mann has been directed to prepare plans and specifications.

Vincennes, Ind.—A resolution has been passed for improving Second street, from Swartzel avenue to Keho creek, by building a sewer, grading and graveling the street and putting down cement sidewalks, at a cost of $8,777.

Red Oak, Ia.—Council has voted to construct 30,000 feet of curb and gutter; bids will soon be asked for; a petition was presented for nine blocks of brick pavement.—E. S. Boudinot, City Engineer.

Boyne City, Mich.—Council has passed a resolution to bring to a vote a proposition to bond the city for $20,000 to make extensive street improvements.

Detroit, Mich.—Council has directed the Department of Public Works to advertise for proposals for paving Dragoon avenue, from Fort street to Dix avenue, estimated cost $23,218; and Seyburn avenue, from Kercheval avenue to Waterloo street, $5,451; both 26 feet wide, with cedar blocks, on concrete foundation, Medina, Berea or other approved curbing; also to pave six alleys with vitrified brick or concrete.—J. J. Haarer, Commissioner.

Iron Mountain, Mich.—County road bonds, $100,000, have been authorized by vote.—Address County Auditor.

Carterville, Mo.—Plans will be made for seven blocks of brick paving on Main street.—L. M. Jaynes, Mayor; H. E. Moody, City Clerk.

Clinton, Mo.—Plans are being made for two miles of brick paving.—C. V. Berry, City Clerk.

Joplin, Mo.—This city will pave with brick eighteen blocks during coming year.—Hiram Phillips, City Clerk; J. B. Hodgdon, City Engineer.

St. Louis, Mo.—Council has passed ordinances providing for paving alleys, at a cost of $71,000.—W. B. Dryden, Clerk, Board of Improvements.

Butte, Mont.—City Engineer Alex Legget reports that Council will probably order between two and three miles of cement sidewalk this year; last year between four and five miles were built; this year he proposes to build all substructures to cement sidewalks with reinforced concrete instead of with wood; often cement sidewalks are built against retaining walls.

Camden, N. J.—Residents of the Seventh Ward have organized for public improvements in the ward, and will insist on the Street Committee having Chestnut street, from Seventh to Tenth, paved with asphalt; Eighth street, from Pine to Kaighn avenue, paved with Belgian blocks on a concrete foundation, and a public square, bounded by Seventh, Sycamore and Eighth streets and Kaighn avenue, opened.—L. E. Farnham, City Engineer.

Trenton, N. J.—Council has passed over Mayor Madden's veto the ordinance providing for the paving of Princeton avenue with bitulithic; the paving is to extend from Pennington avenue to the East Trenton Railroad, or the full length of the street, with Belgian block between the trolley tracks.

The City Clerk has been directed to publish notice of intention to pave Murray street with macadam and Middle Rose street with asphalt; also for proposals for the paving of Cummings avenue, from Whittaker avenue to Anderson street, with sheet asphalt, and for the construction of sewer No. 409, in Short street.

West Hoboken, N. J.—Ordinances have passed for constructing vitrified brick pavement on concrete foundation in Lester place, from Clinton avenue to West street, and Maple street, from Clinton to Palisade avenues, setting and resetting curbing, flagging and cross bridging; also laying 15-inch pipe Lester place, between West and Spring streets.—Richard J. Lynch, Mayor.

Binghamton, N. Y.—The Board of Contract and Supply will shortly ask for bids on the construction of brick pavements on Robinson and Front streets and Conklin avenue.

Dunkirk, N. Y.—Council has ordered, issued and offered for sale $35,000 bonds to cover cost of paving Wright, Railroad and Fifth streets; City Engineer is completing plans and bids will soon be called for.

Newburgh, N. Y.—Three bids were received for $52,500 of street improvement bonds and of these two offered better than par, both being from outside parties; the Newburgh Savings Bank, the third bidder, offered par. Isaac W. Sherrill, of Poughkeepsie, who bid 100.57, was awarded the bonds; W. J. Hapes & Co., of Cleveland, Ohio, offered 100.02. The bonds bear interest at 4½ per cent., and are serial bonds, one-tenth of the whole amount being due each year. The bonds are to pay for the paving of Lander street and of Leroy place and North Water street.

Niagara Falls, N. Y.—Council has sent a communication to the Board of Public Works asking that Eleventh, Twelfth and Fourteenth streets, between Niagara and East Falls streets, be placed in proper condition, and the matter was referred to the Street Superintendent and City Engineer, with power to act.

Main street property owners, between Cleveland and Niagara avenues, on the east side, petitioned for the paving of the alleys in the rear of their places; referred to the City Engineer to make estimate.

A petition to change the width of Cleveland avenue before paving was referred to Council.

Raleigh, N. C.—The issue of road bonds and for an increased tax for public schools both failed to carry, at the election, May 24.

Ashtabula, O.—Council has voted to pave the north end of Main street with asphalt; a 4-inch concrete foundation is to be used. Council also contemplates the improvement of Fitch street, from Fisk street to Center street, by paving with 4-inch asphalt block, on concrete foundation.—F. W. Wagner, Clerk.

Chardon, O.—The Village Engineer will complete plans and specifications for macadamizing East King street, and as soon as these are finished the improvement will be advertised.

Dayton, O.—Bids will be received, May 11, noon, for $14,500 bonds for paving Williams street, from Germantown to Wolf street; $14,500 for paving River street, from Salem to Ferguson, and $40,000 for repairing and improving certain existing highways.—Edward Philipps, City Auditor.

Defiance, O.—The County Commissioners and the City Council have agreed on the plans for paving Clinton street; either brick or macadam will be used; the improvement will be made early this season; the City Engineer is preparing plans for a number of other streets which Council has definitely decided to pave.

Fremont, O.—Council will pave Front and Tiffin streets; City Engineer Lasley estimates the Tiffin street improvement at $9,200, and the Front street improvement at $14,000.

Galion, O.—Engineer E. G. Bradbury, of Columbus, has been instructed by Council to prepare plans, specifications and estimates for the improvement of West Main street, the estimated cost of which is $33,000 with brick and $44,000 with asphalt.

Marietta, O.—Council has taken the initial step toward paving Green street to the city limits; paving is to be 30 feet wide; the City Engineer estimates the cost of opening Seventh street at $5,200.

Springfield, O.—Arrangements are being made to pave certain portions of Fountain avenue, according to plans and specifications.

Ardmore, Okla.—Council has passed a resolution providing for the paving of 87 miles of streets.—A. Dean, City Engineer.

Allentown, Pa.—Favorable reports were made to Council on the ordinances for the paving of Ridge avenue and Franklin street.

California, Pa.—The Borough Clerk offers for sale $30,000 4½ per cent. street improvement bonds.—R. K. Richardson, Clerk.

Cambridge Springs, Pa.—Council has definitely decided that Venango avenue shall be paved this season, and plans and specifications are being prepared; a number of crosswalk and sidewalk matters are also being considered.

Danville, Pa.—Council is prepared to proceed with the macadamizing of Cherry street, while other streets of the borough, including probably East Market street, will be improved.

Erie, Pa.—The Mayor has endorsed the plan to widen and pave street; plans will be prepared at once, and bids invited; the City Engineer has been instructed to advertise for bids for repaving or relaying the asphalt top of French, from Second to Eleventh; he will prepare plans for constructing sewers in Twenty-seventh street.

Indiana, Pa.—Borough Council has instructed Clerk John S. Taylor to advertise for bids on paving and sewering Philadelphia street, from Fifth to Sixth street, and the cross streets between Church and Water, from Sixth to Eleventh streets.

Johnstown, Pa.—With only about $35,000 to spend, members of Johnstown City Councils have asked for nearly $150,000 worth of improvements. The stack of requests for paving and grading concerns the following thoroughfares: Fend alley, Feeder street, and Strawberry alley, Fourth Ward; Llewellyn street, First Ward; Sell and Darby streets, Eighth Ward; Wood alley, First Ward; Pine street, Seventh Ward; Fairfield avenue, Eighteenth and Nineteenth Wards; Ohio street, Seventeenth; J street, Eighteenth; Chandler avenue, Nineteenth and Twentieth; John street, First and Second; Wood alley, Second; Sixth avenue, Sixteenth; Honan avenue and Iron street, Fourteenth; Turner and Gardner alleys, Thirteenth; Church and Huber streets and Meadow alley, Tenth; Strayer street, Nineteenth; Golde street, Seventh; Feeder alley, Third; Coal street, Tenth; Ogle alley and Adam street, Ninth; Cooper avenue, Twenty-first; Virginia avenue, Eighteenth; Osborn and Akers streets, Eighth; Bond street, Seventeenth; Highland avenue, Seventeenth; Morrell place, First; Hickory street, Seventh; Ebensburg road, Thirteenth; Lowman street, Thirteenth; Dibert, Napoleon, Somerset, Haynes, and Sherman streets and Thomas avenue, Fifth; Everhart and Sherman streets, Sixth.

McKeesport, Pa.—Repairs to the State road in the East End, leading from Fifth avenue, are to be made in the near future.—President Archie Duncan, of the Street Committee.

Pittsburg, Pa.—The repaving schedule has passed both branches of Council; it provides for the letting of about $300,000 worth of work.—George W. Guthrie, Mayor.

Scranton, Pa.—Council has passed to third reading bill authorizing expenditure of $25,000 for the paving of street intersections.

Mr. Jenkins has succeeded in having Select Council ordinance providing for a pave on Fillmore avenue changed so that the pave will go on Van Buren avenue, which will make it four blocks longer. Other new ordinances received by Council were: Crosswalks on Deacon, Woodlawn and other streets in that section; crosswalks on Sumner avenue, and other West Scranton streets; widening of Swetland street, between North Main avenue and Evans court; directing the Public Works Department to see that Van Buren avenue, from Jackson to Washburn streets, is made passable; for the laying of sidewalks on Cedar avenue; for the grading of Beech and Maple streets; for a catchbasin in Rosar court; for crosswalks at Birney avenue and Sanders street.

Wilkes-Barre, Pa.—Ordinance of Alderman Bennett, directing the City Clerk to advertise for proposals for resurfacing and repairing pavements, has been referred to the Street Committee; also a number of other resolutions for street and sewer improvements; the Common Council is considering authorizing the increase of the indebtedness of the city $170,000, and appropriating the said money for the construction of sewers, the repaving of the streets with asphalt, erecting a fire engine house at East End, constructing a police station house, riprapping the river bank, etc.

Providence, R. I.—The General Assembly has passed a bill appropriating $50,000 for ten miles of new roads and $30,000 for repairs.

Dallas, Tex.—Property owners of Exposition avenue have voted to pave their street with vitrified bricks, such as are used on Akard street, at a cost of from $15,000 to $18,000.

Tyler, Tex.—Paving under contemplation will cover about 1,000 feet in length on North Spring street, about 34 feet wide from curb to curb; paving will be of vitrified brick, on 5-inch concrete base, with 1-inch sand cushion.—John H. Bonner, Mayor.

Salt Lake City, Utah.—Council has decided to hold up all sidewalk and sewer extensions until after the bond election for water and sewer mains. Sidewalk extension No. 128, which embraces ten miles of work in the northwest section, at a total cost of approximately $100,000, has been decided on, but the advertisement for bids has been held up temporarily.—L. C. Kelsey, City Engineer.

Norfolk, Va.—Proposals will be received at the office of the City Treasurer until Tuesday, May 12, noon, for $482,000 4 per cent. semi-annual 30-year coupon bonds, issued for the following purposes: For sewerage, etc., in Park Place Ward, $50,000; for improvement of certain streets and for other improvements in Berkley Ward, $52,000; for opening streets, improving streets, for school sites and buildings, and for various other permanent improvements in the six wards of the city, $380,000; total, $482,000. Bids may be for the whole or part of the said bonds, and must state price and accrued interest.—L. W. Tazewell, Chairman, Finance Committee, Common Council; Geo. W. Jones, Chairman, Finance Committee, Board of Aldermen; R. E. Steed, City Clerk.

Norfolk, Va.—Bids will be received, May 12, for the purchase of $482,000 4 per cent., 30-year street improvement bonds.

Tacoma, Wash.—Council has given notice of intention to remove asphalt surface on Pacific avenue and replace with brick on present concrete base; also sandstone block on portion of street; all to be on concrete base with brick gutters, concrete and granite curbs, and necessary storm water drainage; including also taking up and relaying all walks, curbs, aprons, etc., necessary to make same to conform to lines and grade of new improvement, at estimated cost of $113,747, not including the part to be done by the Tacoma Railway and Power Company. City will also grade, construct curbs, gutters and crosswalks of plank, with storm water drainage in East A street, Local Improvement District No. 346, at estimated cost of $4,352.50.—L. H. Pearson, Clerk, Commissioner of Public Works.

West Allis, Wis.—The plans of Mayor F. E. Walsh for macadamizing National avenue, between Seventieth and Seventy-seventh avenues, and of Greenfield avenue, between Sixty-sixth and Seventy-third avenues, will probably also be carried out; the work on National avenue was stopped a year ago by an injunction.—Fred Schmidt, City Engineer.

SEWERAGE

Newport, Ark.—The city may establish improvement district for installing sewers; bond issue for $40,000 may be voted on.

Livermore, Cal.—Plans have been made by E. J. Boland, of Hanford, for a sewerage system for Livermore, comprising ten miles of sewers and a disposal plant, at an estimated cost of $28,027.

Oakland, Cal.—Council has appropriated $15,000 in addition to $22,000 for completing storm sewer on San Pablo avenue and Twenty-second street; also authorized construction of 8-inch sewer, etc., in Twenty-eighth street, from Filbert to Maple street.—Frank R. Thompson, City Clerk.

Pasadena, Cal.—A proposition has been made to Council by men interested in an electrical process of destroying sewage, to build and maintain at their own expense a plant for the destruction of sewage until such a time as the city authorities should judge the experiment a success.

San Francisco, Cal.—Special election has been called, May 11, to vote on issuing $18,000,000 bonds for public improvements; $4,000,000 of this sum will go for a new sewer system.—M. Manson, City Engineer.

Denver, Col.—The Montclair Improvement Society, Dr. Stephen T. Parsons, Secretary, is asking that city supply Montclair District with sewer laterals.

Athens, Ga.—Plans are wanted for a septic tank.—J. W. Barnett, City Engineer.

Blue Ridge, Ga.—Having sold $30,000 of bonds, the city is arranging to begin construction of sewer system, electric light plant and water works.

Gilberts, Ill.—The village has voted to build $1,000 sewer.

Harvard, Ill.—The city is to install sewer system.

Boise, Ida.—Bond issue of $100,000 for public improvements will be voted on at special election May 23.

Bloomington, Ind.—The estimated cost of 10.7 miles of sanitary sewers and purification plant, to be built in this city, is $102,136; bids will be received May 19.—Ulysses S. Hanna, City Engineer.

Brazil, Ind.—Bids will be received shortly for the construction of the proposed sewer.—Geo. A. Fletcher, City Engineer.

Columbus, Ind.—The Board of Public Works will shortly advertise for bids for a pipe sewer, 15,000 feet long.—L. F. Orr, City Clerk.

Indianapolis, Ind.—Plans for the Morris street and River avenue sewer have been completed. Sewer will be about six miles long, of 10-inch pipe to 7-foot concrete or brick sewer, and will cost $120,000; plans are also under way for a $15,000 sewer for West New York street.—Blaine H. Miller, City Engineer.

Knightstown, Ind.—A number of sewers are to be constructed.

Kokomo, Ind.—The city will construct a sewer in Morristown street.

New Albany, Ind.—Residents of Silver Hills, a suburb, are considering construction of a sewer system.

Rockport, Ind.—The city is considering expenditure of $10,000 for sewer extensions.

Mason City, Ia.—The city will construct eight new 8-inch lateral sewers this year.

Sioux City, Ia.—City Engineer G. Y. Skeels has been requested by the residents of Morningside to make plans for a sewer system for that suburb.

Minneapolis, Kan.—Engineers Burns & McDonnell, 821 and 823 Scarritt Building, Kansas City, Mo., are preparing plans for a sanitary sewer.

Dayton, Ky.—An ordinance has passed Council providing for an issue of $48,000 worth of sewer bonds; plans for the Main street sewers have been adopted.

Versailles, Ky.—Bids will be received, May 11, for the purchase of $20,000 sewer and water bonds; interest 5 per cent.—H. C. Taylor, Mayor.

Lowell, Mass.—Ordinance has been before Council to borrow $100,000 for constructing sewers.

Elkton, Md.—The city has voted against bonding for constructing sewer system.—James F. Powers, Mayor.

Joplin, Mo.—Engineers Burns and McDonnell, 821-823 Scarritt Building, Kansas City, Mo., have prepared plans for a brick storm and sanitary sewer, to cost $96,000.—Hirman Phillips, City Clerk; J. B. Hodgon, City Engineer.

St. Louis, Mo.—Plans are under consideration and an appropriation has been asked to lay a 10-foot sewer into the district adjoining the old fair grounds; estimated cost, $170,000.

Sedalia, Mo.—The city contemplates constructing a vitrified pipe sewer.—Charles Baker, City Clerk.

Franklin, N. H.—City will expend about $30,000 for sewer construction.

Gloucester City, N. J.—Council has been petitioned to build sewers, lay water mains and pave East Hudson and Bergen streets.

Merchantville, N. J.—The citizens have voted to issue $70,000 of bonds for the completion of the sewerage system.—D. Everett Hill, 156 Fifth avenue, New York City, Engineer.

Moorestown, N. J.—Township Committee has decided to extend sewer system to Stanwick, the extreme east end of the town.

Paterson, N. J.—The Passaic Valley Sewerage Commission of New Jersey has sent to the various municipalities in the sewerage district a full report of its work, with a plan for stopping the pollution of the Passaic River. The cities and towns will be asked to approve the plan recommended, and should they do so the commission will give out contracts immediately. In a general way the report recommends a trunk sewer from Passaic Falls, at Paterson, to New York Bay, discharging in the vicinity of Robbins' Reef Light, within New Jersey's line of the bay, near the outlet of the Kill von Kull. The main line of the sewer will be through Passaic, Nutley, Belleville and Newark, under Newark Bay and through Bayonne to New York Bay. The total cost will be more than $12,000,000. There will be branch sewers collecting the sewage of the Rutherfords, Lyndhurst, Kearny, Harrison, East Newark, Montclair, Orange, Bloomfield, Glen Ridge and Nutley, the uniting point being at Newark. From the Newark meadows the flow will be pumped through tunnels to New York Bay.

Ventnor, N. J.—At a mass meeting called by Council, those present unanimously voted in favor of purchasing the sewer and water plants; an election will be held shortly to vote on the question of municipal ownership, after which another election will be held to vote bonds for the purchase.—Address Judge Joseph Thompson, Counsellor G. A. Bourgeois.

Lyons, N. Y.—The village is considering construction of sewer system, to cost about $60,000, and matter may be voted on at a special election.

Oswego, N. Y.—Residents along East Side Creek are asking that a trunk sewer be constructed in that vicinity.

Syracuse, N. Y.—Council has declared its intention of ordering a concrete trunk sewer for the Seventeenth Ward at a cost of about $60,000. The sewer will be 38 by 57 inches at its largest section.

Utica, N. Y.—The Commissioner of Public Works has been authorized to begin the construction of storm water sewers, the cost of which will be $25,000.

Barberton, O.—About $20,000 is to be expended this year on sanitary sewerage system and extension of water works.

Canton, O.—Council has sold $27,000 bonds to Haden-Miller & Co., proceeds to be applied to the construction of sewers.

Cleveland, O.—The city is to at once call for bids for constructing intercepting sewers requiring the expenditure of $500,000.

Fostoria, O.—Council has decided to readvertise for bids for the Columbus avenue sewer.

Jefferson, O.—County Surveyor Matson is preparing plans for sewer system for county jail.

Lewisville, O.—Steps are being taken looking to the construction of a complete sewerage system for this village.

Lockland, O.—The Council of this village has authorized the sale of $48,000 bonds for the sewer system, to sewer the southern and central portions of the village.

Middletown, O.—City Engineer McAlee has plans drawn and estimates made for sewers on Clark and Crane streets; estimated cost, $4,000; Council will also pave Crawford street.

Portsmouth, O.—Council has decided to adopt a more uniform system of sewer construction and paving of alleys; the ordinance to pave Robinson avenue has passed its final reading; the Service Board has recommended the construction or rebuilding of the outlet of the Eleventh street sewer.

Salem, O.—A sanitary sewer is to be immediately constructed on both sides of West Main street; also in Penn and Washington streets.

Springfield, O.—The Engineering Department has submitted two estimates for sewers in the southwestern part of this city; total cost to be $5,600.

Struthers, O.—The State Board of Health has accepted plans for proposed sewer system for this place, with the provision that a sewage disposal plant be put in when ordered by the Board.

Urbana, O.—The Board of Public Service is considering establishment of a sewer system.

Wilmington, O.—The city will vote May 18 on a proposition to issue $19,000 worth of bonds for sewer system.

Wyoming, O.—Council has passed resolution for $48,000 bond issue for constructing a sewer system.

Stillwater, Okla.—An ordinance is before Council authorizing an issue of $67,000 bonds for water, light and sewer purposes.

Portland, Ore.—Mount Tabor Improvement Association has appointed committee, Frank Perkins, Chairman, to take steps for the construction of an extensive sewer system to serve the territory north of Belmont street.

Altoona, Pa.—The City Engineer has been instructed to advertise for bids for furnishing sewer inlet covers and also for the construction of sidewalks under the provisions of the ordinance which directs the city to lay the same under certain circumstances.

Cambridge Springs, Pa.—Council has determined to proceed with the work of getting the plans and surveys ready for the main sewer extension and the Church and Thomas street sewers, and to put these matters in shape to submit to the State Board of Health for approval.

Donora, Pa.—The Engineer has been directed to make a plan of the proposed extension of the Ninth street sewer, the route to be to Meldon avenue and thence to Eighth street; after completing the plans Mr. Weis, a member of the Council, is to take them to proper officials of the Pennsylvania Railroad and ask consent of the railroad to make necessary change of the grade of Meldon avenue, which passes the railroad depot.

Upland, Pa.—The State Health Department has requested the borough to devise means to stop the pollution of Chester Creek and the Delaware River.

Yorkville, S. C.—Bids will be received May 25, noon, for $25,000 5 per cent. semi-annual bonds for installing sewerage system and extension of water works system.—M. E. Willis, Chairman, Commissioner of Public Works.

Chattanooga, Tenn.—City Engineer Robert Hooke has prepared an estimate for a sewer to drain a pond near the National Cemetery, to cost $10,000; he has been requested to make plans and estimates for a sewer and pumping station to carry off the sewage now going into Chattanooga Creek.

Salt Lake City, Utah.—The citizens will vote on an issue of bonds for water and sewer purposes.—L. C. Kelsey, City Engineer.

Salem, Va.—About $6,000 will be expended for the construction of pipe sewers in West Salem.—Walter Watson, Engineer.

Rhinelander, Wis.—The city contemplates constructing tile sewers on sundry streets.—Gust. Swedberg, City Clerk.

West Allis, Wis.—An election will be held May 14 to decide the question of issuing $124,000 sewerage bonds.—F. E. Walsh, Mayor.

WATER SUPPLY

Foley, Ala.—The Consumers' Service Company has ben incorporated for the purpose of installing water system.—Address Frank Fesler.

Eureka Springs, Ark.—Engineer W. H. Schieber, Leader Block, Springfield, Mo., is preparing plans and will receive bids for a reinforced concrete dam, to cost $24,000.

New London, Conn.—Bids will be received May 2 for the purchase of $100,000 4 per cent. school bonds and $50,000 3½ per cent. water main bonds.—Fitch L. Comstock, City Treasurer.

Atlanta, Ga.—The city contemplates improving water system at a cost of $100,000.

Michigan City, Ind.—Council is considering ordinance introduced by E. W. Hanley, which authorizes the Lake Michigan Water Company to construct a new intake to be not less than 30 inches in diameter and to be not less than 4,000 feet in length from the station; the company is authorized to issue its bonds in the sum of $20,000; the proposed intake is to be built according to plans and specifications drawn by a competent engineer, and the plans must be approved by Council before any contracts are entered into.

Spencer, Ind.—The Reliance Engineering Company, 18 East Fourth street, Cincinnati, O., has been retained to prepare plans for a water works system and electric light plant; water works will be a deep well system and lighting plant will have a capacity of 200 k.w.

Winterset, Ia.—W. K. Palmer Company, Kansas City, Mo., have prepared plans for water system.

Cottonwood Falls, Kan.—An election will be held June 1 to vote on the question of issuing $25,000 bonds for the construction of water system.

Bellevue, Ky.—Council has decided again to advertise for bids to supply the city with water.

Alexandria, La.—Mayor Turner has appointed a committee to discuss the advisability of placing the City Water Works and Electric Light Department in the hands of a commission to direct its affairs; the committee includes Mayor W. B. Turner, Chairman; I. W. Sylvester, City Engineer, and others.

Detroit, Mich.—The Water Board has decided to issue $500,000 bonds to enlarge the pumping plant and to extend the 12-inch main on Jefferson street, a distance of about 5,675 feet.—Robert H. McCormick, City Engineer.

Minneapolis, Minn.—The Water Works Committee has ordered the extension of water mains; extensions to cost $130,000 have been ordered for this season.—Address Clerk, Board of Public Works.

Oxford, Miss.—The Chairman of the University Building Committee has advertised for bids for water plant for the university.—B. M. Kimbrough, Chairman.

Carterville, Mo.—The city contemplates constructing a system of water works; engineer not selected.—L. M. Jaynes, Mayor; H. E. Moody, City Clerk.

Fulton, Mo.—Bonds, $3,000, have been voted to improve water system.

Libby, Mont.—Engineers Pratt & Young have completed specifications for water system.

Grand Island, Neb.—Bids will soon be asked by the City Clerk for the wells, machinery, etc., necessary to supply 2,000,000 gallons of water per day, to be delivered in a reservoir at the city's plant, reservoir to be built by the city.

Sidney, Neb.—Bids will be received for the purchase of $20,000 6 per cent. water bonds.—Leslie Neubauer, Village Clerk.

Albany, N. Y.—The Board of Aldermen has authorized the expenditure of $700,000 for an improved water supply.

Alden, N. Y.—An election will be held to vote on the question of issuing bonds for the extending of water mains.—Address Village Clerk.

Niagara Falls, N. Y.—The request of Water Works Superintendent Calahan for valves, hydrants, etc., was referred to the Board of Estimate and Apportionment.

The City Engineer presented an estimate of $288 for a sewer in Fourteenth street and an estimate of $415 for a water main in Walnut avenue. The board directed that bids be advertised for.

Residents of Weston avenue, between Twenty-second and Sugar streets petitioned for a sewer and water; referred to the City Engineer.

The City Engineer reported in favor of a flush tank, not to cost more than $75, for Ferry avenue, as a result of the complaint of Edward Hilditch regarding a large pond of water. Mr. Read also recommended that certain water mains be laid before pavements are started, and the Board of Public Works directed bids to be advertised for.

West Seneca, N. Y.—Specifications have been prepared for a municipal water plant; the water to be taken from Athol Springs.—Address Clerk, Town Board.

Rocky Mount, N. C.—Estimates are being prepared for proposed light and water system.—W. L. Thorp, Mayor.

Bellefontaine, O.—Dr. J. H. Wilson, representing the Board of Health, has been made Chairman of the Committee to investigate Possum Run water course, which is declared to be a menace to public health.

Chardon, O.—There is a strong movement on foot looking to the construction of a water works system; it is proposed to have a bond issue for this purpose.

Dresden, O.—The Village Council has decided to accept bids for the contract for preparing plans and specifications for the new municipal water works system.

Follansbee, O.—B. J. Sinclair, of Steubenville, has made a proposition to furnish water supply for the town if they will expend $4,000 in laying the mains and installing the plugs and connections.

Fremont, O.—Paul Hansen, Assistant Engineer, has made a complete investigation of the water supply and has pronounced it unsanitary and unsafe; he has estimated and recommended a great many improvements to the system, which will be taken up by Council at once.

Lewisburg, O.—The town is preparing to install and build a municipal light and water plant and a Dayton engineer is now preparing the plans.

Madisonville, O.—Bids will be received May 13 for the purchase of $20,000 4 per cent. 24-year water works bonds.—G. A. Conant, Clerk.

Newark, O.—The Riggs & Sherman Co., Toledo, O., has reported that the distributing system of the new municipal water works plant is being flushed and the machinery is being tested out for the purpose of putting the plant in operation at once; thus far the plant has cost the city $300,000, and an appropriation of $85,000 has just been made for the construction of an additional 16 miles. This, with that already constructed, will give the city a total of 38 miles of water mains.

Newton Falls, O.—Bids will be received May 15 for the purchase of $20,000 4½ per cent water works bonds.—Wade Gardner, Village Clerk.

Springfield, O.—Council has passed a resolution providing for the issue of $20,000 bonds for the extension of water mains.—M. J. Bahin, City Engineer.

Troy, O.—About $8,000 bonds have been authorized for improving the water works plant.

Granite, Okla.—The city has voted $20,000 5 per cent. water works bonds; bids will be received May 25.

Stillwater, Okla.—The citizens have voted $33,000 bonds for water works extension.—C. Edgerton, City Clerk.

Tulsa, Okla.—A new election will be held May 25 to vote on issuing $250,000 bonds for the purchase, improvement and extension of the plant of the Tulsa Water Company.—O. P. Jones, City Clerk.

Waurika, Okla.—The city has voted $40,000 bonds for the construction of water and sewer system.

Alexandria, Pa.—These ordinances have been passed finally by Council: Laying 6-inch main on Law street, between Walnut and Hickory; 8-inch main on West street, from Hamilton to Walnut; relaying mains on Gordon street, between Ninth and Tenth, and on Church street, between Hamilton and Lindon.

Harrisburg, Pa.—Engineers George S. Baton Company, Keystone Bank Building, Pittsburg, are preparing plans for a mechanical filtration plant for the Harrisburg Water Company, including three pumps, three or four steel tanks lined with concrete, and reinforced concrete filter beds; cost, $100,000.

Ligonier, Pa.—The proposition to issue $40,000 of bonds for enlarging water mains was defeated.—E. C. Ramsey, Borough Clerk.

New Castle, Pa.—To increase the efficiency of the fire fighting service in the city, Chief Connery has recommended to the Fire Committee that they compel the water company to raise the two standpipes they agreed to raise—one on the North hill and the other on the West Side.

Pittsburg, Pa.—Architect John P. Brennan is preparing plans for a one and two-story $50,000 power house for the Department of Charities and Correction at Victor.—James P. Shaw, Superintendent.

Temple, Tex.—Council will at once remodel and improve water system purchased from private companies.—Address Mayor Ginnuth.

Graham, Va.—Bonds, $20,000, have been voted for water supply.

Wenatchee, Wash.—The question of issuing $50,000 water bonds will be submitted to a vote of the people May 15.

Wheeling, W. Va.—Representatives of the city Water Department have just completed an inspection of the plant at Belleview, Pa., for the filtration of its water with a view of introducing a similar system for this city.

Wausau, Wis.—The Knox Engineering Company, Chicago, Ill., has been retained to draw plans for a water power plant, to cost $100,000.

West Allis, Wis.—Fred. Schneider, City Engineer, has made plans for extension of water mains on Seventy-third avenue, from Elm street to Summit avenue; on Fifty-sixth avenue, from National avenue to Burnham street, and Fifty-first avenue, from Burnham street to Beloit road.

Regina, Sask., Can.—O. W. Smith and R. S. Lea, Consulting Engineers, employed by the city to look into a source for water supply, have recommended an expenditure of $100,000 for this purpose immediately.

LIGHTING AND ELECTRICITY

Foley, Ala.—An electric light and power plant will be established here.—Address John Walker, Magnolia Springs.

San Francisco, Cal.—The estimate of expenses for the next fiscal year prepared by the Department of Electricity for the Board of Supervisors is $275,450, which includes restoration of the overhead and underground fire and police alarm systems.—Marsden Manson, City Engineer.

Colorado City, Col.—The Colorado City Power and Light Company, with a capital of $35,000, has been incorporated by W. P. Epperson, M. V. Watson and others; the company proposes to use the water of Bear Creek to generate electric power.

Middletown, Conn.—The Middletown Electric Light Company has under construction the question of constructing a plant in which steam turbines will be used.—L. C. Whitney, Manager.

Daytona, Fla.—The plant of the Daytona Electric and Ice Company has been destroyed by fire; loss, $75,000, with insurance at $25,000.

De Land, Fla.—The De Land Electric Light, Power and Ice Company has been incorporated with $100,000 capital.—J. Howell Cummings, President; E. L. Hon, Secretary.

Augusta, Ga.—E. J. Erbelding wants prices on electrical equipment.

Macon, Ga.—The Citizens' Electric Company applied for a charter in the Superior Court with W. A. Burney of Savannah, E. W. Gould, Howard M. Smith and others taking the initiative for the concern; the company will probably start work on a new plant during the late fall; a large plant has been proposed, and, when erected, will mean the outlay of a large amount of capital.

Sparks, Ga.—Engineers J. B. McCrary & Co., Atlanta, have plans for an electric light plant.

Columbus, Ind.—The Columbus Gas, Light and Coke Company has obtained a new 25-year franchise; several improvements and changes will be made; $75,000 will be spent in improvements.

Evansville, Ind.—The Evansville Gas and Electric Company will install new poles on Main street.—Address Superintendent McDonald.

Spencer, Ind.—The Reliance Engineering Company, Cincinnati, O., will prepare plans for a lighting plant.

Terre Haute, Ind.—The Citizens' Gas and Fuel Company will extend system; new mains will be laid in North Thirteenth street, Spruce street, Sixth avenue and Maple avenue; the installation of a 16-inch trunk line in Poplar street also is contemplated.—E. A. Wakeman, Manager.

Delmar, Ia.—The Delmar Gas Company has incorporated for maintaining a gas plant.—H. M. Cassin, Secretary.

Houma, La.—J. Posey Campbell, Mayor of Houma, states that it is expected to start work on the proposed power plant for this city soon.

Kalamazoo, Mich.—The Kalamazoo Gas Company has plans for two miles of extensions to its mains.

Lansing, Mich.—The Michigan Power Company has plans for a steam electric plant of 2,350 h.p., to be built on the banks of the Grand River, near the foot of Ottawa street. The building will have four stories, steel and reinforced concrete. Estimated cost of building and equipment, $150,000.—W. H. Zimmerman, Manager.

Brainerd, Minn.—This city will issue $150,000 bonds for constructing an electric power plant and water works; plans have been prepared by O. Claussen, St. Paul.—H. J. Spencer, City Clerk.

St. Louis, Mo.—A bill to authorize the letting of a street, alley and park light contract, aggregating about $500,000, was introduced in the Council by the Board of Public Improvements; two other bills, one to authorize lighting contracts for public buildings and one to grant a commercial lighting franchise to the successful bidder on the street lighting contract, were also introduced. The street lighting contract is to run ten years from September 1, 1910. It is expected that it will be on terms that will make arc lamps cost the city about $70 per year instead of $98 now paid, and $20 instead of $28 now paid for gas light.

Cleveland, O.—Councilman Flower has introduced an ordinance in Council to authorize the Board of Public Service to expend $2,000 in furnishing a lighting plant for the Fairmount pumping station.

Lewisburg, O.—The town is preparing to install and build a municipal light building and water plant, and a Dayton engineer is now preparing the plans; former Maintenance Engineer of the Water Works Department, Harry McDarg, is making the plans and getting the preliminaries in shape; the cost is estimated at about $26,000.

Lima, O.—Council has turned down the offer of W. Kelsey Schoepf for a new contract on street lights at $70 per arc, and voted to issue $80,000 in bonds for the erection of a municipal plant, and estimates will be asked at once. It is further planned to erect plant of sufficient capacity to furnish commercial current, which will be a competitor to Schoepf's Lima and Toledo Traction Company's plant.

Portsmouth, O.—Council has decided not to build its own lighting plant and will advertise for bids for supplying lights.

Columbia, S. C.—The Columbia Electric Street Railway, Light and Power Company will install a 1,000-k.w. generator and other electrical machinery in its water power plant.—Edwin W. Robertson, President; Alfred Wallace, Superintendent.

London, Tenn.—Council is arranging to establish a municipal lighting plant.—Address W. R. Blair.

Gonzales, Tex.—The Citizens' Light and Power Company will expend $5,000 in improvements.

Kirbyville, Tex.—A company is being organized by R. M. Simmons to establish an electric plant.

St. Albans, Vt.—The St. Albans Gas, Light Company will extend gas mains on several streets.—Address Secretary.

Elm Grove, W. Va.—The City and Elm Grove Railway Company will expend about $35,000, it is said, in doubling capacity of its power-house by installing steam turbines, which will utilize exhaust from four high-pressure engines at present furnishing steam power for electric machinery. Other improvements will be made. The expenditures will be between $60,000 and $75,000.

Welch, W. Va.—The Welch Ice and Cold Storage Company has secured franchise to furnish the city with electricity.—J. J. Rhodes, President; J. M. Wikel, Architect and Engineer.

Menominee Falls, Wis.—The Menominee Falls Electric Lighting Company will make improvements and extensions to cost $16,000.

Watertown, Wis.—Messrs. Davidson, Rau & Kahill, of Milwaukee, Engineers of the Milwaukee Light, Heat and Traction Company, are preparing estimates for power house to be erected at Watertown; the intention of the company is to erect a large power house next year to accommodate the machinery and dynamos necessary to operate all the lines radiating from Watertown, but they will need power to operate the line now building into this city from Oconomowoc, and with that end in view they will begin the construction of a brick building; this will be completed in time to house the dynamos and machinery necessary to operate the line from Oconomowoc; it was also decided to put in improvements at the rough and ready dam, which is to be raised; new machinery will be necessary and a new building will be erected there.

Winnipeg, Man., Can.—The Civic Board of Control has decided to notify all companies having wires on the streets of the center section of the city that the wires must be placed underground within a year from date.—A. N. Ruttan, City Engineer.

FIRE EQUIPMENT

Dadeville, Ala.—A chemical engine will be purchased.—J. B. Rylance, Mayor.

Wardner, Ida.—Arrangements are being made to reorganize the Fire Department.—Address Chief Linck.

Richmond, Ind.—Council proposes to build hose house on the west side.

Lynn, Mass.—Council proposes to purchase a new and additional fire steamer.—Charles H. Spear, City Clerk.

Owatonna, Minn.—The Fire Chief recommends the purchase of chemical engine and hose wagon.

Mt. Iron, Minn.—Architects F. L. Young & Co., Duluth, are preparing plans for a fire hall for the village.

Dillon, Mont.—Council proposes to purchase fire engine.

Miles City, Mont.—The fire company has petitioned for chemical engine.

Camden, N. J.—Council has received offers of several sites for the location of three new fire houses which are to be erected under a bond issue, and the Fire Committee will investigate and report on those most suitable.

Hamburg, N. Y.—The Village Board will purchase hook and ladder truck and other fire apparatus.

Yonkers, N. Y.—Architect Frank Phillips is preparing plans for a $6,000 fire house.

Esmond, N. D.—Council proposes to purchase fire apparatus.

Sherwood, N. D.—A fire company has been organized.—R. S. Anderson, Chief.

Cincinnati, O.—The Board of Public Safety wil readvertise for bids for fire engine.

Philadelphia, Pa.—Arrangements are being made to build fire station in the Twenty-second Ward, Germantown.—Address Councilman Bayard Henry.

Pittsburg, Pa.—A new engine house will be erected at Virginia avenue and Shiloh street.—Address Secretary of the Fire Department.

Pittsburg, Pa.—Architects Mentel & Clark are preparing plans for alterations to fire engine house for the Board of Public Safety.—George W. Guthrie, Mayor.

Scranton, Pa.—Council has passed to third reading bill authorizing expenditure of $36,000 for new fire houses.

Marlin, Tex.—A fire company is being organized.—Geo. H. Carter, Chief.

Georgetown, Wash.—Arrangements will be made to purchase fire engine.—Address City Clerk.

Toppenish, Wash.—Council proposes to purchase fire apparatus.

Wheeling, W. Va.—The Fire Chief recommends the purchase of fire engine and apparatus for the Island Suburb.—Address Clerk of the Fire Board.

PUBLIC BUILDINGS

Florence, Ariz.—The plans of Architect Thornton Fitzhugh, Los Angeles, were accepted for the territorial prison buildings, at Florence.

Conway, Ark.—The matter of issuing $35,000 school bonds is under consideration.—Address Clerk, School Board.

El Monte, Cal.—Architect R. Myron Woolpert, San Gabriel, has plans for a one-story, eight-room brick school building.

Washington, D. C.—Architects C. A. Didden & Son have prepared plans for an addition to hospital for the Georgetown University Hospital; cost, $30,000.

Sanford, Fla.—Architect W. B. Tally, Jacksonville, is preparing plans for a two-story school building, to cost $15,000.—C. R. Walker, Trustee.

Brunswick, Ga.—Architects Edwards, Walter & Parnham, Atlanta, will prepare plans for county school building.

Conyers, Ga.—The citizens of Rockdale County will vote May 8 on the question of issuing $10,000 Court House bonds.

Chicago, Ill.—Plans are being prepared by Holabird & Roche, 100 Jackson boulevard, for a seven-story fireproof hospital, to be built at a cost of about $300,000, for Cook County. The building will occupy a site at Harrison and Lincoln streets.—Joseph F. Hass, County Clerk.

The Commissioners of Cook County, William McLaren, Superintendent of Public Service, rejected all bids for alterations and changes in the county morgue at the Cook County Hospital, Harrison and Wood streets.

La Salle, Ill.—The citizens have voted $20,000 school building bonds.—Address Clerk, Board of Education.

Coatesville, Ind.—Architects Herbert L. Bass & Co., Indianapolis, have completed plans for a two-story school building for W. E. Greenlive, Trustee; cost, $25,000.

Iowa Falls, Ia.—Council has decided to build City Hall and engine house.

Wichita, Kan.—Bonds, $150,000, have been voted for the erection of a high school building.

Duluth, Minn.—Architects Radcliffe & Price are preparing plans for the superstructure for a $50,000 two-story school building for the Board of Education.—Charles A. Bronson, Clerk.

Gilbert, Minn.—Architects Bray & Nystrom, Duluth, are preparing plans for a $50,000, two-story high school building for the Board of Education.—Mr. Chin, Clerk.

Mt. Iron, Minn.—Architects F. L. Young & Co., Duluth, are preparing plans for a jail for the village.

Dayton, Miss.—The Board of Supervisors of Newton County (Jackson) announces that at the May meeting of the Board plans

and specifications will be considered for a new court house at Decatur, to cost not less than $30,000 nor more than $50,000.

Joplin, Mo.—The citizens voted in favor of issuing $65,000 bonds for school building purposes.—I. N. Thirlkeid, Secretary, Board of Education.

Oronogo, Mo.—Architects Garstang & Rea, Joplin, have prepared plans for a two-story school building for the Board of Education, to cost $9,000.

St. Louis, Mo.—Architect William McArdle is receiving bids for a two and one-half-story school building, at Old Orchard, for the Board of Education; cost, $16,000.

Springfield, Mo.—Architects Reed & Heckenlively are receiving figures for a two-story, $5,000 jail addition for Greene County.—W. B. Cloud, County Clerk; B. J. Deimer, Presiding Judge.

Valley Park, Mo.—Architect J. Hal Lynch, St. Louis, is receiving bids for a 2½-story school building for the Board of Education, to cost $25,000.

Kearney, Neb.—The Board of Public Lands and Buildings rejected all bids for the erection of a cottage at the Boys' Industrial School.—George C. Junkin, Secretary; George A. Berlinghof, Architect, Burr Block, Lincoln.

Clifton, N. J.—Architect H. T. Stephens, Paterson, has about completed plans for a two-story addition to the High School building for the Board of Education; cost, $13,000.

Hoboken, N. J.—Architects Ludlow & Valentine, New York City, have completed plans for additions to three-story school building for the Stevens Institute of Technology; cost, $16,000.

Lakeview, N. J.—Architect Wm. P. Fanning, Paterson, is preparing plans for a two-story school building for the Board of Education; cost, $30,000.

Laurel Springs, N. J.—Architect Clyde S. Adams, Philadelphia, has plans for a two-story addition to school house for the Board of Education.

Trenton, N. J.—Architects Kleeman & Fowler, First National Bank Building, have plans for a two-story, $25,000 school building for the Board of Education; brick and stone, open plumbing, plate glass, electric fixtures, slate roof and steam.

Brooklyn, N. Y.—Architects Parfitt Bros. have completed plans for a two-story addition to the Kings County Court House; cost, $500,000.

Buffalo, N. Y.—City Architect Howard L. Beck has been instructed to prepare plans for remodeling old school building into police station.

The Board of Supervisors is having specifications prepared for remodeling the contagious building at the Erie County Hospital.

East Bloomfield, N. Y.—Architect J. Mills Platt, Rochester, has prepared plans for a two and one-half story school building for the town; cost, $25,000.

Huntington, L. I., N. Y.—Associate Architects Adden & Parker, Boston, and Wm. S. Phillips, New York City, are preparing plans for a $80,000, 3-story combined grammar and high school building for the Board of Education.—George C. Henrickson, Chairman, Building Committee.

New York, N. Y.—The jury of architects selected to pass on the competitive designs for the new municipal building and bridge railroad terminal which is to be built on the site bounded by Tryon row, Park row and Duane and Centre streets, has decided to recommend the acceptance of the plans drawn by McKim, Mead & White; the design for the building is after the French Renaissance style. Should the recommendation of the jury be acted on by the municipal art commission, which will have the final award, the new building, counting the two lower stories, to be used for railroad terminal purposes, will be twenty-three stories high. The cost will be about $7,000,000, exclusive of the amount paid for the site.

Norwick, N. Y.—Architect Joseph Blaby, Palmyra, N. Y., has prepared plans for a municipal building; press brick, stone and steel, fireproofing, steel, electric and gas fixtures, etc.

Sanford, N. C.—Architect H. L. Lewman, Louisville, Ky., has plans for a court house for Lee County.

Alliance, O.—Architects Howard, Inscho & Merriam, Columbus, are preparing plans for a two-story school building for the Board of Education; cost, $25,000.

Chardon, O.—Chardon will have a new Town Hall and fire engine house combined; the election to issue $80,000 bonds carried by a vote of 151 to 17.

Lancaster, O.—Plans are being prepared by Architects Richards, McCarty and Bulford of Columbus, for a $25,000 hospital building to be erected by the Board of Public Service; the size will be 40x100 feet.

Painesville, O.—Architect Franz Warner, Cleveland, has been commissioner to prepare plans for an auditorium addition to the high school building for the Board of Education.

Sebring, O.—Architect George W. Ashby, Chicago, is preparing plans for a school building for the Board of Education.

Toledo, O.—The Board of Education, Geo. L. McKesson, Business Manager, will have plans prepared immediately for a two-story, four-room addition to the Auburndale school; cost, $16,000.

Ryan, Okla.—Plans and specifications will be received by the School Board for a two-story and basement ten-room brick school building.

Boswell, Pa.—Preliminary steps toward the erection of a municipal building were taken at a meeting of Council and B. F. Thomas, R. E. Lochrie and J. W. Griffith were appointed a committee to work for the materialization of the project.

Collingdale, Pa.—Architects Frank Miles Day & Bro., Philadelphia, have plans for a two-story addition to school house for the Board of Education; cost, $10,000.

Harrison, Pa.—The Township Commissioners are fully convinced of the necessity of a Town Hall and are preparing for the erection of a suitable building on the lot purchased some years ago, near Center street; the amount in the hands of the treasurer will be almost enough to cover the approximate cost of the new building, $5,000 or $6,000.

League Island, Pa.—Architects Rankin, Kellogg & Crane, Philadelphia, have plans for a three-story addition to officers' quarters at the League Island navy yard.

Millvale, Pa.—Architects C. M. Bartberger & Son, Pittsburg, have been commissioned to prepare plans for a three-story school building for the Board of Education; cost, $60,000.

Sharon, Pa.—The Grand Jury has instructed the County Commissioners to proceed at once with the construction of a new Court House for Mercer County, to cost $200,000.

San Juan, P. R.—Frank E. Perkins, Architect, of New York City, has been commissioned to prepare plans for a $300,000 capitol building for Porto Rico.

Architect Horace Trumbauer, Philadelphia, Pa., has been selected by the United States Commissioner of the Interior to prepare plans for a penitentiary at San Juan; cost, $120,000.

Brunson, S. C.—Architects Schand & La Faye, Columbia, are preparing plans for a school building for the High School Board; cost, $10,000.—W. D. Barnes, Chairman.

Dallas, Tex.—It was decided to issue $25,000 bonds for the erection of an industrial school building.—S. J. Hay, Mayor.

Harrisonburg, Va.—Architect Charles M. Robinson, Richmond, has prepared preliminary plans for a school building; cost, $10,000.

Rhinelander, Wis.—The city has had plans made for a two-story and basement City Hall, 54x86 feet. Press brick and cut stone, composition roof, oak finish, maple floors, marble and mosaic, gas and electric fixtures, galvanized iron cornice, lavatories and water closets; cost, $80,000.

Architect C. H. Tegen, Manitowoc, is preparing plans for the two-story Court House, 95x120 feet, for the Oneida County Board; brick and stone, composition roof, oak finish, maple floors, marble and mosaic, gas and electric fixtures, lavatories and water closets; the Board will receive bids after June 10.—Arthur Taylor, Chairman Building Committee.

Superior, Wis.—The Board of Education, L. A. Nichols, Secretary, has plans and will receive bids shortly for a three-story high school building, 102x172 feet; brick, stone and steel, slate roof, oak finish, maple floors, marble and tile, gas and electric fixtures, water closets, lavatories and steam heat; cost, $30,000.—German & Lignell, Duluth, Minn., and E. L. Barber, Hammond Block, Superior, Associate Architects.

ELECTRIC RAILWAYS

Marysville, Cal.—W. H. Parks, Marysville, is reported to be promoting a project for a belt line electric railway in the city.

Redlands, Cal.—Redlands Central Railway, J. H. Fisher, Manager, has asked franchise for extension from its present terminus on Brookside avenue to Redlands Junction. The company has a right of way over private property and the foothills back of Loma Linda and plans to extend the road from Redlands Junction to Riverside as soon as possible. Later the company also plans extensions to Crafton and Mentone and probably some mountain resort on the east for the line.

Washington, D. C.—Bill is before United States Senate authorizing the City and Suburban Railway Company to make several changes in its trackage system in the northeast section of the city.

Atlanta, Ga.—The State Railway Commission has granted permission to the Atlanta and Carolina Railway Company to construct electric lines aggregating 170 miles and to issue bonds to the amonnt of $6,000,000 for the purpose of building and equipping the road.

Bloomington, Ill.—Plans and surveys have been made and right of way secured for the extension of the Bloomington, Pontiac and Joliet Interurban Line south from Pontiac to Chenoa; the extension will be about 10 miles long.—H. A. Fisher, Joliet, President.

Chicago, Ill.—The Woodstock and Sycamore Traction Company was incorporated with a capital of $1,000,000, to construct an electric railroad; Clinton G. Lumley, E. C. Spinney and Irving V. Stephens are among the incorporators.

Elgin, Ill.—The Elgin, Woodstock and Lake Geneva Railroad will begin construction work this summer on its projected electric railway between this city and Algonquin.—Frank R. Spear, President of the Spear, Miller & Co., Chicago, Ill., is President of the electric railway.

Mattoon, Ill.—The Mattoon, Shelbyville, Pana and Hillsboro Traction Company have been granted a franchise to operate its system in the streets.

Murphysboro, Ill.—The Murphysboro Light, Heat, Power and Traction Company, J. H. Hardy, President, has been granted a franchise for an electric railway, and will soon select engineer to go over ground and prepare plans; power house will also soon be started.

Woodstock, Ill.—The Woodstock & Sycamore Traction Company has been incorporated. The principal office is in Chicago and the capital stock is $1,000,000. The road is to be constructed from Woodstock, McHenry County, through the Counties of McHenry, Kane and DeKalb to Sycamore, DeKalb County. The incorporators and directors are Clinton G. Lumley, E. C. Spinney, Irving V. Stephens, E. B. Harang, S. H. Rhodes, William L. Abbott, George W. Lyndon, George T. Goodrow, Henry P. Heiser, N. G. Schmitz, and Charles A. Spenny.

Decatur, Ind.—Project for extension of Fort Wayne and Springfield Electric Railway, from Decatur, its present southern terminus, south through Portland to Richmond, has been revived.—W. H. Flodderjohann, Decatur, President.

Evansville, Ind.—The Board of Public Works has granted a franchise to the Evansville Terminal Railway Company; the company will build a traction line from this city to Newburg, Ind., to connect with the Evansville and Eastern traction line; work will be started at once.

Frankfort, Ind.—The Indianapolis, Frankfort, Delphi and Chicago Traction Company, a new company which proposes to build an interurban line from Frankfort, where a line will be operated also to Hammond by way of Delphi and Monticello and to furnish electric lights and power for commercial purposes, has filed articles of incorporation with the Secretary of State; the company is capitalized at $100,000; it is proposed to make the headquarters at Frankfort; those who have subscribed stock in the company are W. H. Cohoee, Herbert F. Wills and others; the company is organized to succeed the Frankfort, Delphi, Northern Traction Company.

Richmond, Ind.—The Richmond & Winchester interurban plans to begin construction of its line this summer; it will be 25 miles long and will extend from Richmond to Winchester, passing through Wayne and Randolph Counties and serving Chester, Fountain City, Lynn, Snow Hill and Woods; stock is being subscribed for purposes of incorporation, making surveys and obtaining right of way.

South Bend, Ind.—The South Bend and Logansport Railway Company has been incorporated and proposes to operate a street and interurban company from South Bend through Lakeville, La Paz, Plymouth, Argos, and Rochester to Logansport; capital is $10,000.—A. Coquillard, T. P. Moredock, P. J. Moulihan, H. C. Snell and Frank Rogers are interested.

Colfax, Ia.—Colonel James P. Donahue, Davenport, has asked Council for a franchise for a street car line from the Rock Island depot to the Colfax Sanitarium.

Knoxville, Ia.—Samuel Ware, of the Engineering and Construction Company, Chicago, Ill., is making a survey for a proposed electric railway between this place and Dallas.

Waterloo, Ia.—The Iowa Railroad Company has been incorporated to build an electric railway from Waterloo to Perry via Cedar Falls, Normal, Lincoln, Grundy City, Eldora, Hubbard, Story City, and Boone, with a branch from Story City to Ames, a total distance of 127 miles; the cost of construction and equipment has been estimated at $3,868,600; the power house is to be located at Eldora.—James F. Hardin, General Manager, Eldora.

Lawrence, Kan.—Engineer Wm. Lamkin and eight engineers will make the surveys in for the proposed Coffeyville-Topeka-Kansas City Electric trolley line; they established quarters here and will work out of here in three directions; the survey they are making is definite enough to enable the contractors to go ahead and begin grading and laying track without any further instructions or plans.

Chesaning, Mich.—The Saginaw, Owosso and Lansing Electric Railway received a franchise to build an electric line, connecting Saginaw and Lansing.—J. A. Thick, Detroit, is interested.

Detroit, Mich.—Council has granted a franchise to the Kemiweld Can Company, V. C. Snyder, Manager, Clay and St. Aubin avenues, to construct, maintain and operate a line of railway connecting its works with main lines, under supervision of Department of Public Works.—J. J. Haarer, Commissioner.

Lansing, Mich.—Practically all right of way for projected electric railway between this city and Saginaw has been secured, and work may be started this summer; J. A. Thick, Detroit is promoting the project.

Whitehall, Mich.—Engineers are now engaged in surveying a route from Sweet's Station, five miles south of here, for an electric line to run to a new summer resort which is just being opened at Little Blue Lake, in this county; the road will be about four miles long.—Address George E. Coville.

Louisiana, Mo.—Louisiana Light, Power and Traction Company, E. E. Murray, Secretary, Louisiana, Mo., will probably commence work this summer on its projected 11-mile electric line between this place and Bowling Green.

Springfield, Mo.—Engineer W. H. Schrieber, Leader Block, is preparing plans and will receive bids for a 12-mile long electric railroad, from Springfield to Nixa, for the Nixa and Southern Interurban Railway Company, Springfield; will start survey in about seven days.

Brooklyn, N. Y.—The New York and Queens County Railway Company has filed notice of its intention to extend its road from the company's tracks on Jackson avenue, Borough of Queens, opposite the bridge plaza of the Blackwell's Island bridge, thence along the bridge plaza and approach and across the bridge to the Borough of Manhattan.

Bowling Green, O.—Lake Erie, Bowling Green and Napoleon Railway Company is stated to have about completed arrangements for the extension of its line from this place to Tontogany, this summer, and that construction contracts will be let shortly.

Findlay, O.—It is planned to begin construction work soon on the Findlay and Marion Railway and Light Company's proposed line between Marion and Findlay; it will be about 100.46 miles long.—R. P. Hankey, President, Detroit, Mich.; G. W. Meeker, Secretary and Treasurer, Columbus, O.

Weston, Ore.—E. S. Isaacs has been granted franchise for electric railway along Water street. The Oregon and Washington Traction Company, which Mr. Isaacs represents, is now said to have secured practically all of its right of way up Pine Creek to Weston, ten miles.

Fort Worth, Tex.—Northern Texas Traction Company (a Stone & Webster property), which operates an interurban line between this city and Dallas, is seeking an amendment to its charter allowing an increase of capital stock from $2,500,000 to $3,000,000.—H. T. Edgar, Fort Worth, General Manager.

Richmond, Va.—It is stated here that the Southern Richmond Railway Company, chartered in 1902, is preparing to start construction work on an electric line running from Fulton to Warwick Park by way of Chatsworth. It is estimated that the work will cost about $100,000.—Colonel C. P. E. Burgwyn, Engineer.

Wheeling, W. Va.—The Wheeling Traction Company proposes to build several extensions radiating from Wheeling.—Albert M. Schenk & J. J. Holloway, Directors.

Appleton, Wis.—Extensions of local street car line from State street to the fair grounds is under consideration.

Brantford, Ont., Can.—Local electric railway is to double track its lines on the main streets.

BRIDGES

Hamburg, Ark.—All bids were rejected for constructing seweral steel bridges.—J. C. Brown, Judge, Ashley County.

San Luis Obispo, Cal.—Bids will be received May 10 for the purchase of $26,000 5 per cent. county bridge bonds.—John Kelshaw, Treasurer.

Vidalia, Ga.—The Augusta Construction Company will award contract shortly for constructing foundations for steel drawbridge on Georgia and Florida Railway, between Vidalia and Hazlehurst, Ga.

Sycamore, Ill.—A special session of the Board of Supervisors was held for the purpose of considering new bridges for Cortland and Afton townships, made necessary by newly constructed drainage canals in these townships; petitions for seven bridges were referred to a special committee, three bridges being allotted to Cortland at an estimated cost of $3,100 and four in Afton at $3,200; they will be made of iron and cement; the county in each case stands half the expense and the township the other half.—T. W. Dodge of Malta, Chairman, County Board.

Dayton, O.—Bids will be received by the Board of Public Service shortly for a seven-span structural steel, iron and concrete bridge, 700 feet long, at Salem avenue and the river; cost, $170,000; plans, etc., at office of A. J. Cellarius, Engineer, City Hall.

The County Commissioners have authorized an issue of $50,000 4 per cent., 20-year bridge bonds.—Address County Auditor.

Minneapolis, Minn.—The citizens of Minnetonka have petitioned the County Supervisors to make an appropriation to aid in building a steel and concrete bridge over Minnetonka Creek.—Address County Auditor, Minneapolis.

Meadville, Miss.—The Franklin County Board will issue bonds for construction of three steel bridges.

Joplin, Mo.—City Engineer J. B. Hodgdon is preparing plans and will receive bids for steel viaduct approaches over Joplin Creek for the city; cost, $50,000.—Herman Phillips, City Clerk.

Springfield, Mo.—City Engineer H. G. Horton is preparing plans for two reinforced concrete bridges, one 25-foot span and the other 32-foot span, at Booneville and Main streets, for the city.—G. W. Hackney, City Clerk.

Nebraska City, Neb.—The County Commissioners have rejected all bids received April 15 for constructing county bridges and new bids will be asked for.

Jersey City, N. J.—The Board of Freeholders has decided to make another effort to have a new draw put in the Turnpike bridge across the Hackensack River, put in commission; Alex. F. Hamill has been appointed by resolution to prepare the plans and specifications for the new span.

Plainfield, N. J.—The County Freeholders, Somerville, N. J., are to construct a concrete bridge on Somerset street at Greenbrook road.

Oneida, N. Y.—The Board of Public Works is preparing to advertise for bids for the construction of a new concrete bridge over the Conwasselon Creek on the Canal road, between Durhamville and Lenox Basin; the present bridge is no longer safe; the new bridge will cost in the neighborhood of $1,000 and will be built just as soon as the necessary advertisements are run in the city official papers; City Engineer George S. Tibbits has prepared plans for the new bridge, which will be entirely concrete.

Cincinnati, O.—The County Commissioners have authorized an issue of $50,000 20-year, 4½ per cent. bridge bonds.—Address County Auditor.

A public hearing will be held May 12, at Room 402 Custom House, to consider plans for bridge proposed to be constructed across Ohio River at Parkersburg, W. Va., by the Parkersburg Bridge Company; James A. Newell, President; maps of locality and plans of proposed bridge on file at United States Engineer's office, 411 Post Office Building, Pittsburg, Pa., and Room 405 Custom House, Cincinnati, O.

Dayton, O.—Council has passed ordinance providing for a $170,000 bond issue for the construction of a bridge over the Miami River at Monument avenue.

Norwalk, O.—W. J. Watson, Cleveland, has plans under way for a new bridge to be erected by the County Commissioners over the Vermilian River at Wakeman; as proposed, the bridge is to be of reinforced concrete and will cost about $20,000.

St. Bernard, O.—Agitation for the construction of a viaduct to span the roads, yards and factory locations along Carthage pike has been again taken up by citizens of the Millcreek Valley; it is thought that the most practical location would be from Township avenue in Elmwood place; the Millcreek Valley Business Men's Club and the Hartwell Improvement Club are interested.

Springfield, O.—The proposed bridge across Buck Creek at Nelson street is now assured, as all of the necessary names of property owners have been secured and all that remains to be done to get the work started will be for Council to pass the necessary ordinance; Council will next decide upon the bridge, get the railroad companies to raise their tracks at that point and proceed with the bond issue.

Zanesville, O.—The County Engineer is preparing plans for repairing Dresden suspension bridge over the Muskingum River.

Holidaysburg, Pa.—L. D. Acker has been appointed a viewer to report on project for construction by county of a bridge over Clover Creek in Houston Township.

Washington, Pa.—The County Commissioners propose to issue $200,000 bonds to pay its share in the building of bridge at Donora.—Address County Auditor.

York, Pa.—Viewers have reported favoring the construction by the county of a bridge over Codorus Creek, in Shrewsbury Township.

Yankton, S. D.—The City Engineer has been directed to prepare plans for a concrete bridge at Douglas avenue.

Benton, Tenn.—County Court has voted an appropriation for the construction of three bridges over the Ocoee and Hiawasser Rivers.

Ft. Worth, Tex.—The city and county propose to build jointly a $50,000 concrete bridge across the Trinity river at Arlington Heights.

Fort Atkinson, Wis.—Town has set aside $1,700 to pay one-half the cost of building an iron bridge with cement floor over Bark River near this city.

Racine, Wis.—The Board of Public Works has prepared plans for rebuilding approaches to Mead street bridge; estimated cost, $9,750; also for replanking the Sixth street viaduct; estimated cost, $7,270.—P. H. Connolly, City Engineer.

MISCELLANEOUS

Atlanta, Ga.—The Committee of twenty-five of the Atlanta Chamber of Commerce has adopted a report calling for $1,500,000 bond issue for city improvements; report will now be submitted to the directors of the Chamber of Commerce and transmitted to the Finance Committee of Council with the recommendation that they act favorably upon it; the Legislature will be very probably asked to allow a bond election in Atlanta for this issue, and the election will likely be held in 1909; it is proposed to spend this money in this way: $500,000 for schools, $500,000 for sewerage, $500,000 for water works.

Washington, D. C.—The appropriations of $10,000 each for concreting the bottoms of the swimming pools at the bathing beach and for maintenance, equipment and supervision of playgrounds were made immediately available by the Senate, which passed the District appropriation bill on April 28.—Jay J. Morrow, Engineer Commissioner.

Waycross, Ga.—The matter of issuing $100,000 Charlton County improvement bonds will be submitted to a vote of the people.—Address County Treasurer.

Minneapolis, Minn.—Bids will be received May 7 for the purchase of $250,000 sewer bonds, $250,000 permanent improvement bonds, $125,000 park and improvement bonds.—Dan C. Brown, City Comptroller.

St. Louis, Mo.—A public bath is to be constructed under the newly formed Public Baths Commission, of which B. C. Cazanas is Chairman.

Albany, N. Y.—The expenditure of $100,000 has been authorized by Council for erecting a Soldiers' and Sailors' monument in the city.

Canal Dover, O.—Over $46,000 is to be expended the coming summer, a large portion of which will be devoted to various municipal improvements.

Columbus, O.—Members of the Board of Public Service visited Cleveland to inspect the system of garbage disposal in operation there, and may visit several other cities where such plans are used; the purpose is to inform themselves on the operation of various systems subsequent to the opening of bids May 11 for the erection of a disposal plant in Columbus.

Defiance, O.—A 190-foot dry dock capable of holding two canal boats will be built here this summer, in connection with two new concrete locks; the locks will cost about $8,000 apiece.

East Liverpool, O.—Engineer Kelly has prepared plans for a large number of improvements around the lake at Laurel Hollow Park, which will involve an outlay of $10,000; this includes a new concrete wall and bottom for the dam.

Du Bois, Pa.—At a meeting of business men the subject of the disposal of garbage and rubbish was the topic of discussion, and it was the unanimous opinion that the town should proceed at once to provide some kind of an incinerating plant for disposing of the rakings and scourings of town.

Johnstown, Pa.—Council has for consideration two propositions bearing upon the river problem; one an ordinance authorizing a $35,000 bond issue for dredging out the bar at the confluence of the Stony Creek and Conemaugh, and a petition of residents of the Sixth Ward, who live along the Stony Creek and are willing to wall their properties if the city will take care of the cross streets and alleys; both measures were referred to the Highways Committee.

Philadelphia, Pa.—Mayor Reyburn has awarded $5,875,000 4 per cent. semi-annual thirty-year city bonds, proposals for which were opened April 27, to H. F. Eachman & Co., of Philadelphia, and Mackay & Co. and A. B. Leach & Co., of New York, jointly, at $104,299.

Scranton, Pa.—The new Council apparently favors the establishment of a system for the collection and disposal of garbage by the city, which was rejected by the old Council and will undoubtedly include in the budget an item of $20,000 to try the system for a year.

Council has passed as far as third reading bill for the erection of a garbage plant at a cost of $100,000.—J. Benj. Dimmick, Mayor.

Salt Lake City, Utah.—The Mayor recommends issue of $600,000 public improvement bonds.—Address Mayor Bransford.

BIDS RECEIVED

Hayward, Cal.—The Board of Town Trustees has issued a permit to the Barber Asphalt Company to commence improvement work on Castro street; the company has undertaken the work by private contract and has succeeded in signing up a majority of the property owners along the 6,000 feet of the street favoring the work; the street is to be graded and bituminized at a cost of 27 cents a square foot.

Riverside, Cal.—Winters & Shull were awarded the contract by Council for improving Walnut street at $8,714.

Colorado Springs, Colo.—Doyle & Schwartz were awarded the contract for the 1908 sewer extensions; the N. W. Haas Plumbing and Heating company was the only other bidder; the successful bid, which was in schedule form, provides for the expenditure of about $4,000 by the city.

Bristol, Conn.—The contract for street sprinkling in the borough has been awarded to the P. H. Condon Company at $175 per month; there was one other bidder, F. J. Emmett, at $200 per month.

Hartford, Conn.—The contract for constructing 4,500 linear feet of gravel road in the town of Lisbon has been awarded to A. Vito, of Thompson, Conn., at $1.05 per linear foot. Other bidders were: Pierson Engineering and Construction Company, Bristol, Conn., $1.35; W. B. Wilcox, Mystic, Conn., $1.43.

The Board of Contract and Supply has awarded the following contracts: For collecting garbage for a term of five years, to the Thomas Stafford Contracting Company at $11,540 per year; for collecting ashes and rubbish from the rear of houses, $21,124 a year for a period of five years, with the understanding that the contract may be changed to provide for the collection of ashes and rubbish from sidewalks, as heretofore, for $17,940 per year.

Washington, D. C.—Bids were received as follows for the construction of an east side intercepting sewer: (a) Warren F. Brenzier Company, Second and O streets, S. E., Washington; (b) E. G. Gummel, 300 Rhode Island avenue, Washington, ordinary excavation, 5,800 cubic yards, (a) 65 cents, (b) $1; embankment in place, 1,200 cubic yards, (a) 30 cents, (b) 25 cents; sewer brick masonry, 12 cubic yards, (a) $14, (b) $18; vitrified brick masonry, 125 cubic yards, (a) $21, (b) $23; concrete masonry "D", 700 cubic yards, (a) $8.50, (b) $9; 12-inch diameter sewer pipe, 200 feet (a) 70 cents, (b) $1; 6-inch pipe, 1,000 feet, (a) 35 cents, (b) 30 cents; tunnel section, complete, (a) $2,900, (b) $3,700. Total, (a) $16,269, (b) $19,691.

Albany, Ga.—The following contracts were awarded by Council for water works material: Cast-iron pipe and special castings, United States Cast-iron Pipe and Foundry Company, Chattanooga, Tenn.; valves and boxes, Fairbanks Company, Baltimore, Md.; hydrants, R. D. Wood & Co., Philadelphia, Pa.—Y. C. Rust, City Clerk.

Atlanta, Ga.—Scott Bros., of Lynchburg, Va., have been awarded the contract for the excavation work in constructing the reservoir, with a capacity of 350,000,000 gallons of water. The work will involve the removal of about 125,000 cubic yards of material.—R. M. Clayton, City Engineer.

Cairo, Ill.—The Board of Local Improvements has awarded contract for the construction of vitrified tile pipe sewers, house connections, and inlets and brick manholes on Division street, Center street and Twenty-first street, to Hawes & Canery, for $10,516.84; also for the construction of a vitrified tile pipe sewer, with house connections on Poplar street, from Twentieth street to Thirty-fourth street and a vitrified brick pavement and brick catch basins and combined curb and gutter on the said street, from the east line of Washington avenue to the south line of Thirty-fourth street, to Roy L. Williams, for $60,593.40.—George Parsons, President.

Collinsville, Ill.—O. T. Dunlap, Edwardsville, was awarded contract for the paving of District No. 1. J. L. R. Wadsworth, Mayor; A. C. Powell, Engineer. The bid follows: 17,880 cubic yards excavating, 4-inch Portland concrete base 1-3-6, 2-inch sand cushion, 65,729 square yards vitrified brick, 1 to 1 Portland grout filler, 30,571 linear feet pitch exposed joint, ½-inch sand cover; 65,729 square yards finished pavement, $1.80 per square yard for Brazil or Purington and $1.68 for Banner brick. Split sandstone curbing, 5x20 inches, on blocks, 30,571 linear feet; 59 cents per foot. Sewer pipe in place, average 5-foot cutting, 645 linear feet 12-inch; 45 cents per foot. Sewer pipe in place, average 5-foot cutting, 705 linear feet 18-inch; 76 cents per foot. 21 brick catchbasins, 9-inch wall, internal, 5 feet x 22 inches x 30 inches, ½-inch plaster, c. i. top, No. 325, $30 each; Other bidders were: M. C. Gass, Belleville; Wolfe, Mauphin & Curdis, Alton; John Keeley, East St. Louis; Hefkin Bros., Belleville; Reeb Bros., Belleville; W. H. Hill, East St. Louis; F. C. Meredith, Terre Haute, Ind.; E. J. Stoltz, Belleville; A. F. Franks, Jacksonville; O. T. Dunlap, Edwardsville; John McCurdy, Davenport, Ia.; A. W. Eisenmeyer, Granite City.

Joliet, Ill.—Bids from William Moran and Monahan Brothers for the construction of the Seventh Ward sewer and water main system were opened by the Board of Local Improvements and referred to the City Engineer to canvass before the contract will be let.

The bond for $5,000 and the contract of Ross & Curtis for the Meeker avenue sewer and water main was approved, the sureties being George Bush and B. E. Burke.

Monahan Brothers were awarded contracts for the construction of the Illinois street water main at $651.35 and the Allen street sewer at $890.45.

Peoria, Ill.—The contract for paving Flora avenue its entire length of two blocks was let to the Crescent Contracting Company for $5,099.55; the only other bidder was D. A. Nyers, whose bid was $5,383.98.

Springfield, Ill.—The Capital City Construction Company, city, was awarded contract for repairing the asphalt paving in Peoria at $1.85 per yard; there are about 2,500 square yards of repair work to be done.

Evansville, Ind.—There were only two bidders before the Board of Public Works to bid on the improvement of seven streets, the Western Construction Company and Stinchfield & Reichert; the bids for asphalt on Illinois, from First avenue to Garfield, Elliott from Washington to Chandler, and Ninth from Walnut to Canal, were $1.98 per square yard. The bid for Wadsworth macadam on Emmett from Madison to Second street was $124.

Owing to the fact that a large dirt fill would be necessary, the three blocks on Main street, from Louisiana street to Morgan avenue, will not be paved, the Board refusing to open bids for the work.

Knightstown, Ind.—Edward Payne, of Newcastle is low bidder on the construction of 4,300 feet of sewer at $9,000.

La Porte, Ind.—The County Commissioners have awarded contracts for the proposed new Superior Court House, there being 23 bidders for the various parts of the construction work. The contracts awarded and the totals follow: General contract, William F. Stillwell, Lafayette, $88.757; heating, Staiger Hardware Company, city, $4,814.48; plumbing, Staiger Hardware Company, $2,494; electric wiring, Boyd & Garrettson, city, $1,200; total, $97,265.48.

The bidders on the contract complete were: Caldwell & Drake, Columbus, Ind., $100,340; W. J. Turnes & Co., Chicago, $112,040; Rickman's Sons Company, Kalamazoo, Mich., $107,198; William Grace & Co., Chicago, $115,040.

Others bidding on the general work exclusive of the plumbing, heating and electric wiring were: William F. Stillwell, Lafayette, $88.757; Warren Construction Company, Chicago, $108,953; Larson & Danielson, Laporte, $100,589; J. C. Devine, Alliance, O., $103,700; W. H. Raney, Chicago, $99,750; Henry Koelin, Michigan City, $96,447.

Steam heating: Peru Heating Company, Peru, Ind., $5,298; A. E. Werkoff, Lafayette, $5,022; Gallaher & Speck, Chicago, $5,488; F. A. Clegg & Co., Louisville, $5,738; Huffman & Conklin, Columbus, O., $4,488; S. A. Esswein Company, Columbus, O., $5,575; Staiger Hardware Company, Michigan City, $4,814.48.

Plumbing: A. E. Werkoff, Lafayette, $2,732; S. A. Esswein, Columbus, O., $2,950; Staiger Hardware Company, Michigan City, $2,494; P. J. Dolman, Laporte, $3,720.22.

Electric wiring: F. H. Cheyne Company, Indianapolis, $2,200; Sanborn-Marsh Company, Indianapolis, $1,315; G. W. Cann & Co., Lafayette, $2,670; Wysong & Co., Michigan City, $1,307; Boyd & Garretson, Michigan City, $1,200.

Salina, Kan.—John Ritchie, of Topeka, was awarded the contract for street paving at about $110,000.

Wichita, Kan.—The following bids have been received by the Council for the construction of sanitary sewer No. 9: McIntyre & Tesse, $6,366; Baker & Chain, $6,310; Municipal Construction Company, $6,257.—R. N. Dorr, City Clerk.

Louisville, Ky.—E. T. Slider, of New Albany, has been awarded the contract by J. B. Jones & Co. for furnishing the material for the construction of Section B of the southern outfall sewer; it will require 17,000 yards of gravel, 6,000 yards of sand and 10,000 barrels of Portland cement.

Versailles, Ky.—Both sewerage and water works contracts were let to the Schefold Company, of New Albany, Ind., the cost of the sewer being $20,500 and of the water works $32,000; there were three other bids; the remainder of the entire issue of $60,000 will probably be used for putting in additional water mains, as the plans were based on pipe at a much higher value; bonds will be sold and operations begun within the shortest possible time.

Other bids received were for sewers: Charles F. Fitch & Co., Louisville, Ky., $20,900; E. P. Porter, Clinton, Ky., $24,778; John B. McLean & Co., Newport, Ky., $23,500.—Drake C. Naive, Clerk of Council.

Other bids for water works were: Using (a) brick pump-house, (b) concrete blocks for pump-house, (c) solid concrete for pump-house, (d) concrete tower and tank instead of steel: Charles F. Fitch & Co., Louisville, Ky., (a) $37,950, (b) $38,300; (c) $39,000; (d) $40,400; Fairbanks, Morse & Co., (a) $32,700; P. H. Porter, Clinton, Ky., (a) $36,222.—Drake C. Naive, Clerk of Council; the Holmboe Company, Lincoln Bank Building, Louisville, Ky., Engineers-in-Charge.

Portland, Me.—Only one bid, that of the Portland Street Sprinkling Company, was received by Council for street sprinkling for this season, and the contract will be awarded to this firm.

Lynn, Mass.—A contract has been signed by the Board of Public Works with the Warren Brothers to lay 10,000 square yards of bitulithic pavements on Western avenue, from Market square to the Saugus Branch crossing, and another signed with the Connecticut Hassam Paving Company for the 10,000 or so square yards from the railroad crossing to Houghton square; the Hassam paving is to cost $1.75 per square yard and the bitulithic $2.25.

Menominee, Mich.—N. J. Mulholland & Son of Kaukauna, Wis., have been awarded the contract for the construction of pipe sewers.—F. S. Norcross, Clerk.

Plymouth, Mich.—Heffner & Son was low bidder for paving with brick, bids received April 23, at $22,062.05, the details being as follows: Extra gravel for filling, 75 cents per cubic yard; 4-inch drain tile, 6 cents per linear foot; 8-inch sewer pipe, 30 cents per linear foot; 10-inch sewer pipe, 400 linear feet, 35 cents; 12-inch sewer pipe, 300 linear feet, 35 cents; 18-inch sewer pipe, 735 linear feet, 75 cents; 24-inch sewer pipe; catch basins, No. 7, $30; valve wells; manholes, No. 8, $25; inlets, No. 18, $8; cast-iron manhole covers, $6; stone headers set, 498 linear feet, 25 cents; stone curbing set; dressing and resetting old curb, linear foot, $1.15; concrete curb and gutter, 7,783 linear feet, 50 cents; old stone headers set, linear foot, 15 cents; brick pavement, gravel, concrete, 10,277 square yards, $1.54; cement filler, 10,277 square yards, 6 cents; tar filler, 10,277 square yards, 18 cents; extra earth excavation, cubic yard, $1; concrete, 12 cubic yards, $4.25; concrete curb, 5x20 inches; concrete curb, 6x20 inches; stone curb, 4x20 inches; extra concrete, cubic yard, $6; gutter plates, lb., 3 cents; Pioneer filler, 20 cents; total (a), $22,062.05; 10,277 square yards concrete macadam (c), at $1.23, $12,640.71; total $18,259.56.

Other bids were: Kneal & Ryan, Lansing, with brick (a) $1.70, total $25,325.54; Charles Killen, Bluffton, O., (a) $1.66, $27,143.52; Kanmeier Bros., Port Huron, (a) $1.72, $25,643.39, with 8-inch macadam (b), $1.35, $20,813.20, with cement macadam (c) $1.65, $23,893.30; Johnson & Lynn, Paulding, O., (a) $1.49, $23,311.43, (c) $1.09, $18,172.93; H. E. Terry, Saginaw, (a) $1.72, $25,626.02, (b) $1.15, $18,226.58; (c) $1.13, $18,921.04; Hatch & Sons Co., Detroit, (a) $1.76, $26,226.70, (b) 97 cents, $17,080.17; Luman Bros., Detroit, (a) $1.67, $23,795.09, (c) $1.40, $20,506.55; Baker & Chaney, Detroit, (a) $1.65, $23,289.76, (b) 90 cents, $14,759.85, (c) $1.05, $16,291.40. Price for pavement includes 10,152 cubic yards excavation.—The Riggs & Sherman Co., Toledo, O., Engineers.

Newburyport, Mass.—The Cashman Bros. Company has been awarded the contract by the city for street sprinkling for the year at 11 cents per linear foot, furnishing the water.

Macon, Mo.—The contract for new jail and Sheriff's residence has been let to the Pauly Jail Building Company, of St. Louis, at the low bid of $21,747.

Concord, N. H.—Fred E. Ellis, of Melrose, Mass., has been awarded the contract for 4,975 feet of trap rock pavement to be constructed here, at $5,645, and for constructing a macadam road in Pembroke, at $3,365.—A. W. Dean, State Engineer.

Camden, N. J.—The Street Committee of Council has awarded the contract for paving Federal street from Cooper's Creek to Twenty-seventh street; from the creek to Marlton turnpike the street is to be paved with Belgian block on a concrete base, by B. T. Sweeten, for $2.45 per square yard; from Marlton turnpike to Twenty-seventh street the street is to be paved with sheet asphalt by the Filbert Construction Company at $1.91 per square yard.

Hoboken, N. J.—Bids were received for repairing asphalted streets as follows: The Barber Asphalt Paving Company, 114 Liberty street, New York, $1.70 per square yard for binder and surface, $2.23 per square yard for binder, surface and Belgian block; Uvalde Asphalt Paving Company, 1 Broadway, New York, $2.38 and $2.63 per square yard.

Newark, N. J.—The contract for constructing Section 3 of the Meadowbrook sewer has been awarded to F. M. Stillman & Co.

Trenton, N. J.—The C. B. Walton Company has been awarded the contract for macadamizing the Hopewell and Stoutsburg road at a cost of $14,360.64. Contracts were also approved for the macadamizing of the Etra and Perrinville road by H. N. Scott and the construction of a steel and concrete bridge on the Hopewell and Stoutsburg road and a terra cotta pipe culvert in the approach to the Crosswicks bridge by Newton A. K. Bugbee.

Albany, N. Y.—The following bids were received by the Board of Contract and Supply for the improvement of McCarty avenue, from the west line of South Pearl street to the east line of Browne street; Mulderry Bros., Albany, $21,935; John M. Holler, Albany, $22,125; Edward F. Dillon, Albany, $22,286; Michael F. Dollard, Albany, $19,762.

Bids for the improvement of Broad street, from the south line of Second avenue to the north line of Seymour avenue, were received as follows: Michael F. Dollard, Albany, $7,983; John M. Holler, Albany, $9,088; Mulderry Bros., Albany, $8,143; Edward F. Dillon, Albany, $9,384. Walter Melius is City Engineer.

Ithaca, N. Y.—The successful bidder for the construction of the new Federal Building is the Cecil S. Saunders Construction Company of Cleveland, O.; there were twelve bidders; the lowest bid brings $80,000 and the highest $104,000.

New York, N. Y.—The following are the bids opened by J. W. Stevenson, Commissioner of Bridges, for constructing roadway, pavement and inside trolley tracks of the Blackwell's Island bridge over the East River between Manhattan and Queens Boroughs: J. H. Gray & Co., $234,010; Charles Meads, 299 Broadway, $185,100; Williams Engineering and Construction Company, 21 Park Row, $191,175; Snare and Triest Company, 143 Liberty street, $184,760; Cooper & Evans, 220 Broadway, $183,000; E. Huhne, 247 Fourth avenue, $192,115; North Eastern Construction Company, 225 Fourth avenue, $17,952; Maryland Steel Company, 71 Broadway, $182,970.

Niagara Falls, N. Y.—Twenty-three bids were received by the Board of Public Works upon three contracts, two for sewer and one for water main. The bids and the successful bidders follow:

Contract No. 91, water main in Whitney avenue, North avenue and South avenue: Tony Fiorella, $1,072.13; Charles T. Shepard, $1,138.40; W. H. Cookman, $1,054.19; W. A. Shepard & Co., $1,044.19; Simon Fiorello, $1,282.70; awarded to W. A. Shepard & Co.

Contract No. 193, for a sewer in Seneca and Lockport streets and in the alley between Main and Tenth streets: Tony Cuisano, $954.15; George H. Findlay, thrown out for not being formal: Tony Fiorello, $970; W. A. Shepard & Co., $977.25; Dominick Sanno, $1,040.60; Joseph D. Dauer, $1,051.85; W. H. Cookman, $989.50; Charles T. Shepard, $1,096.50; awarded to Tony Fiorello.

Contract No. 194, for a sewer in McKoon avenue, De Veaux avenue, President street, Central court, South avenue and Whitney avenue; Dominick Sanno, $829; Joseph D. Dauer, $1,130.20; Tony Fiorello, $1,100.40; George H. Findlay, $1,081.60; Simon Fiorello, $1,145; W. H. Shepard & Co., $1,044; W. H. Cookman, $1,115; Charles T. Shepard, $1,098; awarded to Dominick Sanno.

Oswego, N. Y.—Proposals for the steam pumps and turbines for the new lake water system were received from nine different companies and three companies made two different propositions, which makes the number of bids twelve in reality. The Watson-Stillman Company of New York, which quoted the low price, made two propositions, the lowest of which was $6,260. The highest bid came from the Allis-Chalmers Company of Milwaukee and was for $13,470. The bids were: D'Olier Engineering Company, $8,555 and $10,245; Wheeler-Green Electric Company, $10,865; Morris Machine Works, $13,300; R. D. Wood & Company, $9,033 and $8,483; Platt Iron Works, $10,487; Watson-Stillman Company, $6,290 and $6,500; Bravell, Doyle & Company, $12,600; Allberger Pump Company, $9,745; Allis-Chalmers Company, $13,470.

Newton, N. C.—The Lynchburg Foundry Company of Lynchburg, Va., has been awarded the contract to construct municipal water works.—W. B. Gaither, Mayor.

Ashland, O.—B. A. Phillips, city, has the contract for paving Cottage and West Eighth streets on a gravel foundation, sand filler and Metropolitan block; estimated cost, $9,000.

Cincinnati, O.—An order for 2,200 tons of cast-iron pipe, from 4 to 24 inches, was awarded to the Dimmick Pipe Company for $21.70 a ton.

Columbus, O.—Contracts were awarded for street improvements, aggregating $136,608.55, by the Board of Public Service as follows: Bedford avenue, Bedford to Livingston, W. H. Luchtenberg & Co., $9,571.40; Edward, Cleveland to Jefferson, S. T. Knight, $9,589; Fulton, Miller to Lilley, N. B. Abbott, $7,201.95; Floral, Columbian to Belvidere, W. H. Luchtenberg & Co., $12,781; Jaeger, Schiller to Reinhard, Baldwin Bros. & Graham, $2,107; Kimball, Livingston to Bedford, N. B. Abbott, $8,625.40; Moler, High to Parsons, Baldwin Bros. & Graham, $25,615; Princeton, Broad to Neil, N. B. Abbott, $18,524; Parsons, Main to Livingston, Baldwin Bros. & Graham, $13,404; Seventeenth, Mound to Stone, Baldwin Bros. & Graham, $9,882.80; Studer, Livingston to Columbus, W. H. Luchtenberg & Co., $11,308; Tatnick boulevard, Superior to Belvidere, W. H. Luchtenberg & Co., $7,500.

Dayton, O.—Contracts were awarded for sprinkling thirty-six streets which do not come under the seven and nine-year contract ordinance; those who secured the contracts were: William Turner, twenty-one streets; Peter Dwyer, two; F. W. Kramer, six; L. F. Wuichet, two; L. Wright, one; A. F. Smart, two, and W. Yocum, three streets; bids for sixteen streets were referred to the street committee until protests against sprinkling could be investigated.

Gitsinger Brothers are low bidders for building a retaining wall at Mad River at $4,000.

East Liverpool, O.—The T. A. Gilespy Company has the contract for building 700 feet of dam near Wellsville.

Elyria, O.—Contract for paving Cleveland street has been signed by S. Mendelsohn, who will commence the work at once.

Fostoria, O.—J. J. Rumsey is low bidder on the construction of a sewer on Columbus avenue at $256.

Lancaster, O.—The Ames Pipe Company of Columbus is low bidder on the construction of a cement sewer in District No. 3; it will be 7,200 feet long and will cost $36,000.

George Landen has the contract for the Bayne avenue sewer at $321; the North Main street paving contract with Townsend brick block and asphalt filler has been awarded to Hoffstetter & Dawson at $5,400; High street paving with sheet asphalt and concrete filler, to Mayer Brothers, of Erie, Pa., at $12,000.

Miamisburg, O.—A $69,000 contract for paving with brick of one and a half miles of street has been captured by the J. O. Shoup Company of Dayton.

Niles, O.—The contract for the construction of brick and pipe sewers, bids opened on April 16, has been awarded by the Board of Public Service to James Kane, of Youngstown, O., at $11,649.—James Tregaskis, Clerk of Board.

Richwood, O.—Council has awarded the contract for $62,000 worth of street paving to A. F. Leonard of Gallipolis at his bid of $1.32 per square yard on six-inch gravel bed. —J. C. Kennedy, Engineer.

Steubenville, O.—The Board of Public Service opened bids for the construction of the South street sewer as follows: Ferry & Sons, $10,501 (awarded contract); Logan D. Bird, $11,660; J. Van Meter & Co., $11,945; James A. Rippeth, $12,762.—H. G. Simpson, Clerk of Board.

Youngstown, O.—Coming back home from Meadville, Pa., ex-Serviceman George J. Vetter bested fourteen other contractors in the bids for the repaving of West Federal street, from the public square to North avenue. Each of his bids for all four specifications was the lowest; there was only a few hundred dollars' difference in all of the fifteen bids. Vetter's bids were as follows: Brick, $25,844.36; sheet asphalt, $29,245.06; block asphalt, $36,018.86; creosote wooden block, $37,934.06. The bids will be inspected by the City Solicitor, and if found all right Vetter will be given the contract. The sheet asphalt specifications provide for a top of 2½ inches and a binder of 1 inch; the heaviest top ever laid before in the city was 2 inches; the usual thickness used is 1½ inches; the concrete base under all four specifications is to be 6 inches thick and made of fine limestone. The brick specifications provide for a 5-inch brick instead of the 4-inch used on all other pavements. The wood block specifications require that 20 pounds of creosote be used to the cubic foot of wood, which would make them heavier than water; in other words, destroy their buoyancy. They must stand a severe test, it being required that after twenty-four hours' drying at a temperature of 100 degrees they shall not absorb more than 3½ per cent of water in twenty-four hours' immersion.

Xenia, O.—The Oregonia Bridge Company has been awarded the contract by the county at $11,090 for the construction of the substructure and superstructure of the bridge over Little Miami River at Roxanna.

Altoona, Pa.—Bids for paving ten miles of streets were received by the Board of Public Works from Hagaman, Miller & Hagaman, of Rochester; Bowman Brothers, of McKeesport, and the Metropolitan Construction Company; it was found that the bid of the Metropolitan Company was not filled out properly and in order designated by the specifications. The prices of the Hagaman, Miller & Hagaman bid ranged from $2.26 to $2.47 per square yard for Clearfield brick with grout filler and from $2.46 to $2.62 per square yard for Metropolitan brick with asphalt filler. Bowman Brothers' bid for Porter and Clearfield brick ranged from $2.49 to $2.95 for asphalt filler and $2.33 to $2.80 for grout filler. The Canan, Knox Supply Company's bid for paving of Union alley was $2.28 for asphalt filler and $2.24 for grout.

Allentown, Pa.—Forty-three bids were received for the various contracts the city is to give out. The bids were:

Four Fire Alarm Boxes—Star Electric Company, Binghamton: Star boxes, $460, $400, $300; Gamewell boxes, $250. Gamewell Fire Alarm Company: Police patrol, $150; fire alarm boxes, $200.

Ladder Pipe—M. H. Hart Company, New York: Hart ladder pipe, $200.

Fire Department Supplies—Woodhouse Manufacturing Company, New York: Woodhouse net, $70; Siamese coupling, $9; play pipe, $12.50. Gutta Percha Company, New York: One pony suction hose, Good Will Fire Company, $45. Gutta Percha Company, New York: 550 feet chemical hose, 45 cents per foot. Fabric Fire Hose Company, New York: 1,000 feet Keystone hose, $1 per foot; D. J., 95 cents; 3A, 90 cents; 3B, 80 cents. F. Hersh Hardware Company: 500 feet Revere chemical hose, 50 cents per foot; cotton rubber-lined 2½-inch hose, 70 cents per foot; 500 feet 1-inch chemical hose, 45 cents; 2½-inch cotton, Giant brand, 90 cents per foot. Woodhouse Manufacturing Company: 500 feet cotton, 2½-inch, 65 cents per foot; engine grade, 45 cents (400 pounds test pressure). Gutta Percha Manufacturing Company: 1,000 feet Baker cotton hose, 2½-inch, $1 per foot. Eureka Fire Hose Company: 1,000 feet Paragon, $1; Red Cross, 90 cents; 3-ply, 80 cents per foot (6 months' guarantee). Eureka Hose Company, Eureka, 45 cents. Fabric Fire Hose Company; Jumping net, $90; pony suction hose, $72; Hart ladder pipe, $175. Gutta Percha Rubber Manufacturing Company: Play pipe, $12 each; bronze mounted, $15; hard bronze, $16.50.

Steam Fire Engine: Amoskeag Fire Engine Company: One second size engine, $5,250; rubber tires, $350; ball-bearing, $2,500; relief valve, $45; pony suction hose, $45. Woodhouse Manufacturing Company: Spiral water tube boiler, second size steamer, $5,250. American La France: Second size Metropolitan, $5,250; to rebuild present Silsby engine, $2,250; $125 if present wheels can be used and remodeled. Ahrens Fire Engine Company: Continental, second size engine, $5,425.

Wire—Smith Electric Company, 4½ miles No. 10 wire, $212.71. Thomas Engineering Company: 4½ miles No. 10 wire, $16.85 per hundred weight, or $212.31. Smith Electric Company: 2 miles, No. 10 wire, $94.50. Smith Electric Company: Electric light tester, complete, $162.62 and $202.57. Thomas Engineering Company: Voltmeter, $135.50; ammeter, $20.50; direct current ammeter, $69.

Coal: G. F. Erich: Chestnut stove and egg coal, $4.94 per ton; pea, $3.50; (Buck or Lattimer); Hazel Mountain, $5.04 and $3.75. C. F. Roth: Chestnut stove and egg, $4.98; pea, $3.50 (Buck or Lattimer or Hazel Mountain). Baker Bros.: Buckwheat coal, $2.15 per ton; Cross Creek breaker coal, $2.40. Weston Dodson Company: Buckwheat, $2.19.

Printing and Advertising—Max R. Hartzell: Advertising in "Leader," 40 cents per inch, first insertion, 20 cents for further insertions. "Chronicle and News": 25 cents per square each insertion. Call Publishing Company: 24 cents per square each insertion; locals, 5 cents per line. Democrat Publishing Company: 20 cents per inch. "Daily City Item": 30 cents per square, first insertion; 25 cents subsequent insertions.

Stationery—Wilson Hartzell: $19.64. C. H. Stiles: $21.20.

Printing—Berkemeyer, Keck & Co.: $627.44. Welt Bote Company: $388.75. C. H. Stiles: $474.15.

Water Department—Rensselaer Manufacturing Company: 36-inch check valve, $1,015; 30-inch, $404 each. Water Works Equipment Company: 36-inch check valve, $1,100; 30-inch, $450. Darling Pump Company: 36-inch valve, $900; 30-inch, $300. Donaldson Iron Company: 4-inch water pipe, $23.60 per ton; 6, 8, 10 and 12-inch, $22.75.

Grading Sidewalks—Titus Harmony: 25,000 cubic yards earth excavation, 40 cents; 500 yards rock, 9 cents cubic yard. R. S. Rathbun: Street grading, earth, 39 cents to 45 cents; rock, 75 cents to 79 cents, depending upon the streets. A. Monroe Stephens: Constructing street crossings, vitrified brick, 19 cents square foot; mountain block, 15 cents; river cobble, 9 cents; headers, 40 cents. Titus Harmony presented the only bid for curbing and paving in front of private property. Titus Harmony: Vitrified brick crossings, 21 cents; on concrete base, 22 cents; mountain block, 16 cents; headers, 60 cents. Frank J. Newhard: Crushed stone for streets, Nos. 1 and 2, $1 per ton; No. 3, 90 cents. General Crushed Stone Company: Nos. 1, 2 and 3, $1.65 per ton. Bound Brook Crushed Stone Company: $1.75 per ton. Walker Granite Company: No. 1, $1.65; No. 2, $1.55; No. 3, $1.50 per ton. R. S. Rathbun: Rock Hill trap, $1.69½; Green Lane, $1.65; No. 2, Rock Hill, $1.65; No. 2, Green Lane, $1.62. George H. Clader: Street excavations, earth 37 cents to 40 cents; rock, 74 cents per cubic yard.

George H. Clader: Laying water mains, 12-inch, 50 cents; 8-inch, 45 cents; 6-inch, 40 cents; 4-inch, 35 cents. George H. Hardner: Crushed stone, No. 1, 85 cents; No. 2, 82 cents; No. 3, 78 cents. George H. Hardner: Grading sidewalks, earth, 35 cents; rock, 65 cents. George H. Clader: Crushed stone, Nos. 1, 2, and 3, $1.80 per ton. George H. Hardner: Street grading, earth, 34 cents to 45 cents; rock, 65 cents to 80 cents. George H. Hardner: Laying water mains, 12-inch, 44 cents; 8-inch, 40 cents; 6-inch, 38 cents; 4-inch, 35 cents.

Birdsboro, Pa.—The following bids have been opened by the County Commissioners for repairing the Birdsboro bridge, requiring 13,800 feet of white oak boards: Charles J. Smith, $29.50 per M (awarded contract); Paul L. Lengel, $29.75 per M; Charles Moore, $35 per M.

C. O. Eshleman has been awarded the contract for repairing the Hay Creek bridge at Birdsboro.

Ebensburg, Pa.—W. H. Herr & Co., of Altoona, who did considerable street paving in Ebensburg last year, have a force of Italians at work on Sample street, which was left in an incomplete state during the winter. The block between Cherry alley and Center street will now be paved. Herr & Co. are also repairing those portions of the paved street which got of out repair since being laid last fell.

Huntingdon, Pa.—The following bids for the construction of the sewer system were opened by the Borough Council: A. Anstead, Altoona, Pa., $34,454; Perry, Colohane Company, New York, N. Y., $17,973; Central Construction and Supply Company, Harrisburg, Pa., $41,851; T. M. Oaks & Co., Huntingdon, $23,887; James J .Fresco, Newark, N. J., $48,398; Michael Fritz and James A. Frey, Philadelphia, Pa., $47,549; Saupp & Dhrew, Altoona, Pa., $32,389; Albrecht & Leader, Reading, Pa., $39,664.—J. Murray Africa, City Engineer.

Philadelphia, Pa.—The following data refers to the bid for sewers for which tenders were received April 22:

Main Sewers.—Frankfort intercepting system in Wakeling street: Low bidder, Edwin H. Vare, 710 Betz Building, Philadelphia; 200 feet, 13 feet 6 inches diameter, brick sewer, in full rubble cradle, 8 feet deep, earth excavation, low bid $45.00 per linear foot; 110 feet 13 feet 6 inches diameter brick sewer, in reduced rubble cradle, 16 feet deep, earth excavation, low bid $42.00 per linear foot; 240 feet, 13 feet 6 inches diameter, brick sewer, without cradle, 30 feet deep, half earth, half rock excavation, low bid $41.50 per linear foot; 271 feet, 12 feet 6 inches diameter, brick sewer, in full rubble cradle, 5 feet deep, earth excavation, low bid $41 per linear foot; 50 feet, 12 feet 6 inches diameter, brick sewer, in reduced rubble cradle, 8 feet deep, earth excavation, low bid $40.50 per linear foot.

Cobb's Creek intercepting sewer: Low bidder, Thomas F. Reilly, 918 Harrison Building, Philadelphia; 1,000 feet, 4 feet 9 inches diameter, brick sewer, in reduced rubble cradle, 12 feet deep, earth excavation, low bid $11.33 per linear foot; 2,724 feet, 4 feet 9 inches diameter, brick sewer, without cradle, 14 feet deep, two-thirds earth, one-third rock, excavation, low bid $8.89 per linear foot.

Jasper street sewer: Low bidder, Adolph Jafolla, 767 South Eighth street; 1,168 feet, 4 feet diameter, brick sewer, in reduced rubble cradle, 10 feet deep earth excavation, low bid $9.45 per linear foot; one junction chamber, $1,400.

Tulip street sewer: Low bidder, Adolph Jafolla, 767 South Eighth street; 822 feet, 5 feet 6 inches diameter, brick sewer, in reduced rubble cradle, 15 feet deep, earth excavation, low bid $14.30 per linear foot; one separating chamber, $1,200; one junction chamber, $1,200.

Jackson street sewer: Low bidder, Ryan & Reilly, 14 South Broad street; 342 feet, 6 feet 6 inches diameter, brick sewer, in reduced rubber cradle, 6 feet deep, earth excavation, low bid $17.77 per linear foot; 442 feet, 6 feet diameter, brick sewer, in reduced rubble cradle, 8 feet deep, earth excavation, low bid $15.59 per linear foot; 437 feet, 5 feet 6 inches diameter, brick sewer, in reduced rubble cradle, 12 feet deep, earth excavation, low bid $14.71 per linear foot; 450 feet, 5 feet diameter, brick sewer, in reduced rubble cradle, 14 feet deep, earth excavation, low bid $14.06 per linear foot; 450 feet, 4 feet 6 inches diameter, brick sewer, without cradle, 16 feet deep, earth excavation, low bid $7.43 per linear foot; 433 feet, 4 feet diameter, brick sewer, without cradle, 14 feet deep, earth excavation, low bid $6.89 per linear foot.

Sixty-fourth street sewer: Low bidder, Thomas F. Reilly, 918 Harrison Building; 1,158 feet, 4 feet 6 inches diameter, brick sewer, without cradle, 18 feet deep, half earth, half rock excavation, low bid $12.47 per linear foot.

Sixty-ninth street sewer: Low bidder, Lombardi & Pascussi, 733 Fulton street; 300 feet, 5 feet 6 inches diameter, brick sewer, in full rubble cradle, 4 feet deep, earth excavation, low bid $12.55 per linear foot; 262 feet, 5 feet 6 inches diameter, brick sewer, in reduced rubble cradle, 6 feet deep, earth excavation, low bid $11.80 per linear foot; 400 feet, 5 feet diameter, brick sewer, in full rubble cradle, 4 feet deep, earth excavation, low bid $11.80 per linear foot; 127 feet, 5 feet diameter, brick sewer, in reduced rubble cradle, 8 feet deep, earth excavation, low bid $11.40 per linear foot; one junction chamber, $1,250.

The Boulevard sewer, from Faunce to Hartel street: Low bidder, Edwin H. Vare, 710 Betz Building; 1,280 feet, 13 feet diameter, brick sewer, in full rubble cradle, 6 feet deep, earth excavation, low bid $44.45 per linear foot. The above price includes a trench 350 feet long, 20 feet wide, 3 feet deep, 440 feet of 4-foot diameter sewer, 110 feet of 4-foot 6-inch diameter sewer, an outlet wall and intake wall, also 3 feet of embankment over the entire sewer. Across the boulevard on line of Tyson street: Low bidder, David Peoples, 1000 Betz Building; 200 feet, 7x7 feet, brick sewer, in full rubble cradle, 6 feet deep, earth excavation, low bid $21 per linear foot; 170 feet, 7x7 feet, brick sewer, in reduced rubble cradle, 12 feet deep, half earth and half soft rock excavation, low bid $25 per linear foot.

Oxford avenue, to and across the boulevard: Low bidder, Ryan & Reilly, 14 South Broad street; 517 feet, 5 feet diameter, brick sewer, in reduced rubble cradle, 12 feet deep, half earth, half soft rock excavation, low bid $12.75 per linear foot; 300 feet, 5 feet diameter, brick sewer, without cradle, 20 feet deep, one-third earth, one-third soft rock, one-third hard rock excavation, low bid $12.75 per linear foot; one junction chamber, $800.

Oakland street sewer across the boulevard: Low bidder, Edwin H. Vare, 710 Betz Building; 381 feet, 12x12 feet, brick sewer, in full rubble cradle, 7 feet deep, earth excavation, low bid $45.39 per linear foot. The above price includes an intake wall, outlet wall, 100 feet of trenching and supporting a 30-inch and 48-inch water main on trestle work, also 3 feet of embankment over the entire sewer.

Oakland street sewer extension, Foust to Vankirk street: Low bidder, Bolger & Cummins, 205 Chelton Trust Bldg.; 842 feet, 12 feet 9 inches diameter, brick sewer, in full rubble cradle, 6 feet deep, earth excavation, low bid $31.13 per linear foot. The above price includes an intake wall, 100 feet of trenching and 3 feet of embankment over the entire sewer.—George S. Webster, City Engineer.

Bids have been opened by Assistant Director of Public Works Knight for constructing a driveway along the line of the Fairmount Parkway, from Logan square to Spring Garden street. The specifications contain twenty different items and ten bidders submitted proposals on each item. The specifications called for the excavation of 4,840 square yards for macadamizing, 4,593 feet of curbing, eight inlets; 8,733 yards of macadam, etc. The work will cost about $25,000. Among the bidders were John F. McNichol & Co., Daniel S. Bader, George F. Snyder & Co., John O'Rourke, Filbert Paving and Construction Company and David Peoples.

Mr. Knight also opened bids for sprinkling macadamized roads for the year 1908, for which $25,000 is available. The bidders were: David Peoples, entire city, $6.40 a day for each team; David McMahon, Third District, $5.24, entire city, $5.75; James Irwin, First District, $5.45; entire city, $7; M. J. McGunn, Second District, $6; Michael McNulty, Second District, $5.75; John R. Leewright, Second District, $6, entire city, $7; Daniel S. Bader, Second District, $4.75; Richard P. Bennis, Fourth District, $6.80.

The sum of $5,000 is available for an automobile for the Bureau of Highways. Two bids received, namely, T. M. Twining Company, $3,365, and the Peerless Motor Car Company, $4,550.

Scranton, Pa.—County Commissioners John J. Durkin, Victor Burschel and Morgan Thomas opened bids for the building of sixteen bridges in Lackawanna County; in each instance the contract was awarded to the lowest bidder: the sixteen bridges, the contract price and the bidders were: Bridge over Roaring Brook, in Covington, to Weise & Millard, for $480; between Old Forge and Moosic, over creek near No. 12 shaft, William McLaughlin, $723; in Spring Brook, William McLaughlin, $280; in Clifton, over Belle Meadow Creek, Weise & Millard, $320; over White Creek, in Archbald, James O'Brien, $890; over Jones Creek, in Covington, Weise & Millard, $240; over Blount's Creek, in Moscow, Weise & Millard, $270; over Spruce Run, in Lehigh, Weise & Millard, $330; over Laurel Run Creek, in Newton, W. E. Larne, $265; over Cosner Creek, in Newton, W. E. Larne, $235; over Rushbrook Creek, William McLaughlin, $497; over Jermyn's Creek, in Dickson, William McLaughlin, $640; over Clark's Creek, in Scott, Nicholls & Co., $310; over creek on Scott's road, in Blakely, Nicholls & Co., $400; over Hall's Creek, in Blakely, James & Harkness, $472; over Jermyn's Creek, in Dickson, William McLaughlin, $410.

Yorkville, S. C.—Bids were received April 22 from the following contractors for sewer system: S. E. Construction Company, Bosler & Flynn, McMaster & Ross, C. M. Burkhalter, Perry-Calahan Construction Company, Miller & McClough, Saunders & Redmond, G. W. Waring, Southern States Construction Company, Guignard & Guion. These bids were for labor and material, not including pipe. The bids were received for pipe from Saunders & Redmond, Pomona, and the Chattanooga S. P. & F. B. Company.

The items of the successful bidder, C. M. Burkhalter were: For 8-inch T. C. pipe, 6 feet deep, 20 cents; 6 to 8 feet, 25 cents, 8 to 10 feet, 35 cents, 10 to 12 feet, 45 cents, 12 to 14 feet, 60 cents, 14 to 16 feet, 90 cents; 16 to 18, $1.10; 18 to 20, $1.45, 20 to 22, $1.85. For 10-inch T. C. pipe: 6 feet deep, 22 cents; 6 to 8 feet, 27 cents, 8 to 10 feet, 37 cents; 10 to 12 feet, 50 cents; 12 to 14 feet, 70 cents; 14 to 16 feet, 95 cents; 16 to 18 feet, $1.15. For 12-inch T. C. pipe: 6 feet deep, 30 cents; 6 to 8 feet, 37 cents; 8 to 10 feet, 45 cents. For 500 Ys: 4½ to 7 feet deep, $30; 7 to 10 feet, $35; 10 to 12 feet, $40; 12 to 14 feet, $45; 14 to 16 feet, $50; 16 to 18 feet, $55; 18 to 20, $60. For drop manhole, $5; flush tanks, $60; lamp holes, $7; deep cut connections, $4; rock excavation, $2; cast iron, $40; concrete in forms, $10; concrete around pipe, $10.80.

The bids for the terra cotta pipe received from the Chattanooga S. P. & F. B. Company were for 4-inch pipe, 6 cents; 8-inch pipe, 12½ cents; 10-inch pipe, 18¼ cents; 12-inch, 24 cents; 8x4-inch Ys, 56 cents; 8x8-inch Ys, 56 cents; 10x4-inch Ys, 82 cents; 8-inch Ls, 50 cents; 8-inch Ts, 56 cents.—The Shand Engineering Company, Columbia, Engineers-in-Charge; Captain M. C. Willis, Chairman, Commissioners of Public Works.

Olympia, Wash.—Ruth & Hartman, of Olympia, have been awarded the contract for the construction of State road No. 8 at $5,397 and State road No. 9 at $5,543.

Road No. 11 was bid in by the Board of County Commissioners of Spokane County, the Board being the only ones to submit bids. They were awarded the contract at $13,600.

Green Bay, Wis.—The following bids were received for the construction of asphalt pavements, with concrete combined curb and gutter on the streets described, on April 23, 1908: Main street, from the east end of the bridge over East River to the east line of Pleasant street, and Pleasant street, from the north line of Main street to the north line of Cedar street: P. McDonnell, $18,009.72; R. F. Conway Company, $19,600; Barber Asphalt Paving Company, $21,990; Andrews Asphalt Paving Company (using Land asphalt), $16,813.80; Andrews Asphalt Paving Company (using Bermudez Lake asphalt), $19.226.45. Broadway, from the north line of James street south to the tracks of the Chicago and Northwestern Railway Company: P. McDonnell, $57,124.31; R. F. Conway Company, $61,800; Barber Asphalt Paving Company, $62,265.40; Andrews Asphalt Paving Company (using Land asphalt), $53,152.20; Andrews Asphalt Paving Company (using Bermudez Lake asphalt), $59,977.63. West Mason street, from the east line of Broadway east to the tracks of the Chicago and Northwestern Railway Company: P. McDonnell, $1,207.90; R. F. Conway Company, $1,500; Barber Asphalt Paving Company, $1,533.25; Andrews Asphalt Paving Company (using Land asphalt), $1,125.60; Andrews Asphalt Paving Company (using Bermudez Lake asphalt), $1,270.32. Madison street, from the south line of Main street to the north line of Porlier street: P. McDonnell, $41,899.81; R. F. Conway Company, $42,000; Barber Asphalt Paving Company, $43,190; Andrews Asphalt Paving Company (using Land asphalt), $35,738; Andrews Asphalt Paving Company (using Bermudez Lake asphalt), $40,168. Monroe avenue, from the south line of Porlier street south to the city limits: P. McDonnell, $14,856.50; R. F. Conway Company, $15,000; Barber Asphalt Paving Company, $15,100.50; Andrews Asphalt Paving Company (using Land asphalt), $12,-519.75; Andrews Asphalt Paving Company (using Bermudez Lake asphalt), $14,034.

The items of the work were: Broadway, 24,908 square yards asphalt, 3 feet on 6 feet concrete base, with 6,790 cubic yards clay excavation; Madison street., 17,320 square yards asphalt, 6,450 cubic yards excavation; Main and Pleasant street, 8,194 square yards asphalt, 2,048 cubic yards excavation; South Monroe street, 6,057 square yards asphalt, 2,174 cubic yards excavation; West Mason street, 536 square yards asphalt, 140 cubic yards excavation. The curbing on Broadway amounted to 13,859 feet; Madison, 10,865 feet; Main and Pleasant, 3,438; South Monroe, 3,840; West Mason, 268.

Fergus, Ont., Can.—The contracts for the erection of a new bridge at the Town of Mount Forest have been let by the corporation of the County of Wellington as follows: Steel superstructure with reinforced concrete floor to the Dickson Bridge Works Company, Ltd., Campbellford, Ont., for $5,710, and for the concrete abutments to M. M. Hiles & Bro., of Atwood, Ont., at $4.98 per cubic yard.—James Beattie, County Clerk.

PERSONALS

AUMAN, CHARLES E., Chief of Police of Reading, Pa., has been reappointed by Mayor Rick, together with six Sergeants and sixty patrolmen.

BARRETT, THOMAS A., a newspaper man of Wilkes-Barre, Pa., has been confirmed as Street Commissioner of the city, a position to which he was appointed by Mayor Lewis Kniffen over a month ago.

BERMEL, JOSEPH, President of the Borough of Queens, New York City, recently resigned and sailed for Europe with his wife and daughter for an indefinite stay; Lawrence Gresser, Commissioner of Public Works of the Borough, was elected as his successor over Joseph Cassidy, former President of the Borough, receiving the votes of three of the Queens Aldermen to two for Cassidy.

GOEMANS, J. W., member of the Board of Water Commissioners of De Pere, Wis., has been appointed to succeed himself.

GRIFFITH, WALTER, former Water Superintendent of West Allis, Mo., is a candidate for reappointment before the new Council, making the contention that the appointment of John Neary to the position by the old Council, just before final adjournment, was illegal.

HANSLING, PHILIP, JR., formerly Superintendent of Streets, of Hartford, Conn., is now Secretary and Manager of the Stafford Construction Company, and will have charge of the work on the garbage and ash contracts, which were awarded to the Stafford Company for five years by the Board of Contract and Supply.

HASTINGS, LEWIS M., Cambridge, Mass., has been reappointed City Engineer.

HERING, RUDOLPH, New York City, went abroad April 28 with his family for a stay of three months in Europe, where he will investigate water, sewage and garbage disposal plants.

HINKEL, EDWIN, City Clerk of Milwaukee, Wis., has been reelected.

HOWARD, WILLIAM, has been appointed Superintendent of the plant of the Allegheny Valley Water Company at Tarentum, Pa.

INSKEEP, C. A., has been engaged as City Engineer of Bellefontaine, O., by the Board of Public Service.

IVINS, WILLIAM M., has been elected Chairman of the new Charter Revision Commission of New York City; J. Cowden Meyers, Secretary and Moses Altman, Clerk.

JOHANN, ANDREW, Fort Wayne, Ind., has been appointed Gas Meter Inspector of the city.

JOHNSON, H. A., has been elected City Engineer of Kalamazoo, Mich.

KUEBLER, GEORGE W., President of the Board of Public Works of Altoona, Pa., whose term as member expires on the election and qualification of his successor, recently tendered his resignation as head of the Board in order to obviate complications which might arise by reason of the absence of G. A. Klesius, who proposes making a tour of Europe, and J. B. Andrews was elected President of the Board for the ensuing year.

MCCOMB, DANIEL E., Superintendent of the Sewer Department of the District of Columbia for twenty-one years, and for twelve years prior Engineer on bridge and street work in the city, has resigned to become Chief Engineer of Paving and Sewers of Havana, Cuba, where he will have charge of the expenditure of $15,000,000 in the installation of a modern sewerage system, plans for which he assisted in perfecting nine years ago under Gen. Lawton; his salary will be more than double that of $3,000, which the District pays.

MCDERMOTT, JOHN H., has been elected Water Commissioner of Allentown, Pa.; Leo Wise, City Solicitor; Frank R. Minner, Building Inspector, and Joseph Schmidt, City Clerk, the latter by a unanimous vote.

MASTERTON, M. Lee, has been reelected City Engineer of Johnstown, Pa.

MAY, C. E., has been declared elected Mayor of Edgefield, S. C., and installed in office, while Col. W. P. Calhoun, his opponent, has given notice that he will contest the election.

MILLER, GEORGE W., Chief of the Fire Department of Reading, Pa., has been reappointed by Mayor Rick, who also named George C. Obold as Assistant Chief Engineer of the First District, and Harry Weiler, of the Second District.

MODJESKI, RALPH, Civil Engineer, has been engaged by the city of Portland, Ore., to prepare preliminary plans and specifications for a new high bridge across the Willamette river and for constructing subways under the river, the City Council having recently appropriated $5,000 for the purpose.

SAWYER, E. A., has been appointed City Surveyor of Manitou, Col., by the Town Trustees; W. H. Bray as Street and Water Commissioner; C. W. Dolph, Town Attorney; George L. Columbia, Marshal, and F. W. McArthur, Fire Chief.

SCHNEIDER, FRED, City Engineer of West Allis, Wis., has been reappointed; he was formerly a member of the Board of Public Works of Milwaukee.

SMITH, HERBERT J., has resigned as City Engineer of Putnam, Conn.

STEIN, JACOB, of Bessemer, Tenn., has been elected City Engineer of Florence, Tenn.

SWEITZER, WILLIAM, and Edgar A. Frey have been appointed by Mayor Weaver of York, Pa., as Assistant Fire Chiefs to succeed Harry L. Wills and John Bush, who declined, and they were unanimously confirmed.

TIFFANY, R. K., Mayor of Sunnyside, Wash., has resigned, in order to devote his time to his duties with the Washington Irrigation Company, and H. W. Turner has been elected as Chief Executive by the City Council.

TOMLINSON, STEPHEN, for over 30 years Superintendent of the Brantford, Ont., Water Works, died recently.

WOLFE, DR. S. M., has been appointed City Bacteriologist and Water and Milk Inspector of Wilkes-Barre, Pa., by Mayor Lewis Kniffen, and confirmed by Council.

WORTHEN, JESSE M., formerly with the Illinois Highway Commission, has been appointed Assistant City Engineer of Quincy, Ill.

TRADE NOTES

Cast Iron Pipe.—Chicago: Most of the orders being received are from small cities and water works which are now able to float bonds in their own locality. Quotations: 4-inch, $27; 6 to 12-inch, $26; 16-inch and up, $25. Birmingham: Tonnage placed recently comparatively small. Quotations: 4 to 6-inch, $23; 8 to 12-inch, $22; over 12-inch, average $21. New York: Current transactions confined to small orders. Quotations: Carload lots, 6-inch, $23.50 to $24.

Lead.—The American Smelting & Refining Company advanced prices 10 points April 28, making its price in New York 4.10c. This interest has been the cheapest seller for weeks, and outside producers who had been quoting 4.05c. promptly advanced their price to 4.10c. The St. Louis market is very firm at 4c.

Decrease of Capital.—The Montreal Water & Power Company has decreased its capital stock from $2,000,000 to $1,160,000, subdividing the issue common stock of $1,120,000 in shares of the par value of $25 each, and subdividing the unissued stock of $380,000 into 15,200 shares of the par value of $25 each, the preferred stock of $500,000 remaining divided into shares of $100 each.

Gas Company Stops Manufacture.—The Windsor Gas Light Company, of Windsor, Vt., which supplied many towns in the section with its product, has given notice that the manufacture of gas will be stopped within a short time and the property turned over to its bondholders. It is believed that the action was brought about by the appointment of a receiver for the United Illuminating Company, which holds a majority of stock in the Windsor company.

Garbage Disposal.—At a meeting of the Bennett Garbage Disposal Company, Wilkes-Barre, Pa., the following officers of the company were elected: President, James Cool; Vice-President, David E. Bennett; Treasurer, Benj. W. Colvin; Secretary, A. P. Opdyke. It is expected that the work of erecting the plant which starts in a few weeks will progress without a hitch and will be in operation in three months. The entire cost of the plant, together with the plot of ground, will be $35,000.

Lubricating Oil.—C. H. Besly & Co., 15-21 South Clinton street, Chicago, manufacturers of Helment oil, a lubricant for heavy and high speed machinery, offered to send a free sample of their product to managers of water works and lighting plants.

Sewer Pipe.—Directors of the American Sewer Pipe Company have decided to pass the quarterly dividend of ¾ of 1 per cent. on that company's $7,805,700 of outstanding capital stock. Action on this dividend was expected a month ago, but the directors then decided to postpone consideration of the subject in the belief that meanwhile a more definite idea of the business outlook might be obtained. The company paid dividends at the rate of 3 per cent. a year from July, 1904, up to date.

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INCORPORATIONS

Alba Lime Rock Co., Warwick, Pa.; to quarry and prepare for market limestone, rock, marble, granite, etc.; capital, $400.000. Incorporators: George H. Wolle, Clarence A. Wolle, Frederick Straith-Miller, Bethlehem, Pa.; Albert S. Parmalee, East Orange; Robert A. Peattie, 32 Nassau street, New York City.

Atwood-Rearick Co., New York City; engineering and contracting; capital, $5,000. Incorporators: George D. Atwood and L. R. Atwood, 438 Third street, Brooklyn; Charles B. Rearick and A. J. Rearick, 238 Central Park West, New York City.

American Sanitary Co., Buffalo, N. Y.; to manufacture fumigants, disinfectants, etc.; capital, $25,000. Incorporators: C. L. Hazard, B. P. Frazer, Walter H. Means, Buffalo.

Carey Construction Co., Rome, N. Y.; general road and building contractors; capital, $30,000. Incorporators: Lawrence Carey, William P. Snyder, Frank W. Kirkland, Frank George, Rome, N. Y.

Concrete Interlocking Steel Corporation, New York City, to manufacture building materials, machinery, engineering appliances, etc.; capital, $50,000. Incorporators: Anson W. Anderson, Walter H. Wilson, 23 Wall street; Edmond G. F. R. Du Mazuel, 41 Wall street, all of New York.

Eastern Oregon Power Co., Wilmington, Del.; capital, $2,500,000. Incorporators: S. B. Merrick, Ivy, Va.; F. A. Bingham, Chicago; Harry W. Davis, Wilmington.

Just-Tungstein Illuminating Co., New York City; to manufacture electrical bulbs, lamps, globes, etc.; capital, $250,000. Incorporators: Michael Maran, 123½ Second place, Brooklyn; Oscar Wormser, Bath Beach; Pasquale Mastrorelli, 181 Bleecker street, New York.

Keansburg Beach Water Co., Jersey City, N. J.; to operate water works; capital $10,000. Incorporators: Charles L. Noble, Yonkers, N. Y.; Horace A. Rounds, New York; Frank Osborn, Middletown, N. Y.; Frank E. Price, Atlantic Highlands, N. J.; Samuel B. Howard, Millbrook, N. Y.; John R. Turner, Basking Ridge, N. J.; Harry W. Meen, Jersey City.

Landers Power Co., Wilmington, Del.; capital, $100,000. Incorporators: F. M. Shive, S. E. Roberson, Harry W. Davis, Wilmington.

Mexican Electric Power and Tramway Co., Boston, Mass.; capital, $500,000. Incorporators: F. M. Shive, S. E. Roberson, Harry W. Davis.

Nassau Sand and Gravel Co., New York City; sand, gravel, stone and building material; capital, $10,000. Incorporators: John Fleming, No. 109 Broad street; John W. Sullivan, 827 East Ninth street; William E. Cleary, 17 South street; Robert Rogers, 23 South street, all of New York City.

New York Rotary Fire Hose Drier Co., New York City; to manufacture tools, machinery, etc., used in the hose and general rubber business; capital, $100,000. Incorporators: William B. Carlton, Frederick C. Peterson, Clyde W. Miller, 110 West Thirty-fourth street, New York City.

New York Silica Brick Co., New York City; manufacture bricks, concrete, pipes, etc.; capital, $150,000. Incorporators: William B. Parsons, 60 Wall street, New York City; Joseph Bailey, Patchogue, N. Y.; S. L. F. Deyo, 13 Park row; St. John Clarke, 411 East Forty-second street; Frank A. Crandoll, 39 Cortlandt street, New York City.

Piper City Telephone and Telegraph Co., Piper City, Ill.; to operate telephone and telegraph lines; capital, $10,000. Incorporators: James P. Glass, W. H. Roberts, J. A. Montelius, Jr.

Somer Township Telephone Co., Champaign, Ill.; to operate a telephone system; capital, $8,000. Incorporators: O. B. Flatt, M. C. Busey, P. P. Dunn.

Syracuse, Sanitary Co., Syracuse, N. Y.; to remove filth and waste; capital, $9,000. Incorporators: James Webb, John Young, William Ryan, Syracuse.

WANTS

WATER WORKS SUPERINTENDENT, technical graduate, experienced with filtration systems or well supply, desires change of location or business; will locate anywhere, but West preferred. Address, 2381, Municipal Journal and Engineer.

TRANSIT MAN—Technical graduate, four years' construction experience, railroad, foundation and tunnel work; formerly employed on river tunnels, New York. Address 239, Municipal Journal and Engineer.

WANTED—Engineers, draftsmen, looking for opportunities to advance; write for list of 500 positions, free for the asking. Hapgoods, 305 Broadway, New York, or 1010 Hartford Bldg., Chicago.

Proposals

SANITARY SEWER SYSTEM AND PURIFICATION PLANT

Bloomington, Ind.

Sealed proposals, addressed to the City Clerk of the city of Bloomington, Indiana, for constructing a sanitary sewer system and purification plant may be filed with the said Clerk before 4 o'clock p. m., May 19, 1908, and will be opened and considered by the City Council at 8 o'clock p. m. on the same date. The work consists of 10.7 miles of pipe sewers ranging from 24 inches to 8 inches in diameter and is estimated to cost $102,000, including the purification plant. Plans and specifications are on file at the office of the City Engineer and City Clerk. Copies of the specifications may be had by applying to the City Engineer, U. S. Hanna.

Proposals must be made on blank forms to be furnished by the Engineer or Clerk. For further information apply to the Engineer.

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SEWER CONSTRUCTION

Bids will be received until noon on Saturday, May 23, 1908, for the construction of 2,450 feet of 12-inch terra cotta sewer and 2,050 feet of 10-inch terra cotta sewer on Merion avenue, and 3,000 feet of 8-inch terra cotta sewer on Highland avenue, averaging from five to eighteen feet in depth, including twenty-seven (27) manholes, and all appurtenances complete.

Plans and specifications may be seen at the office of the Township Commissioners, 205 Mahan Building, Ardmore, Pa., in charge of Robley A. Warner, C.E., Supt. of Health and Drainage.

BRIDGE

Culpeper, Va.

Plans and specifications will be on file at the Clerk's office, Culpeper, Va., after May 1, 1908, for building a three-span steel bridge at Raridan, Va. Abutments and piers of concrete. Bids must be filed in Clerk's office of Culpeper, Va., on or before May 14, 1908.

W. E. COONS,
Clerk of Circuit Court.

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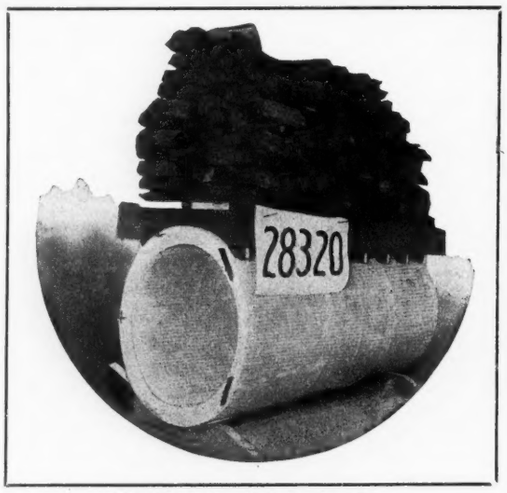

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